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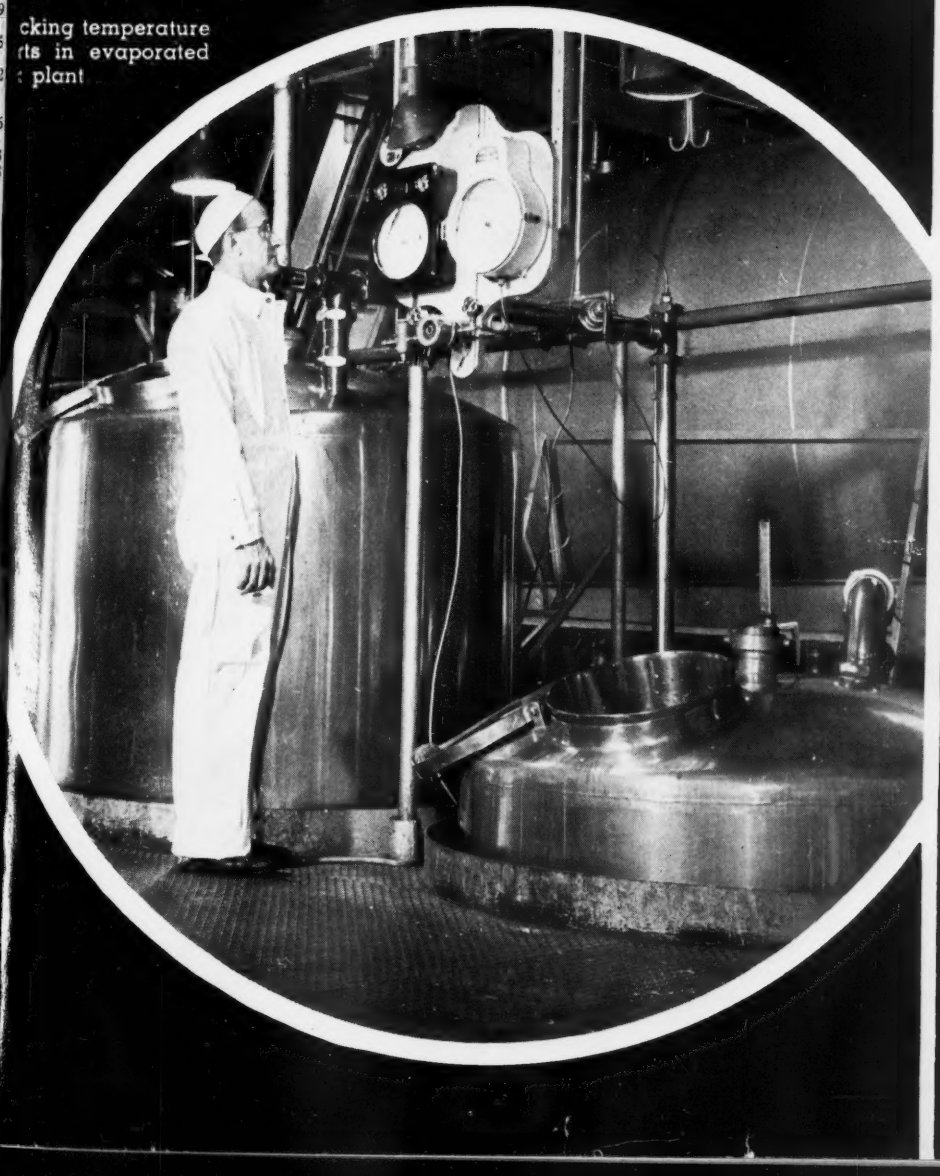
FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



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JANUARY 1944

A Challenge To the Government

How Hormel Plans For Postwar

British Bakers Meet War Crises

What It Costs To Distribute Foods

New Scaler Boosts Fish Production

Maintenance of Electric Motors

Design, Uses of Cabinet Dehydraters

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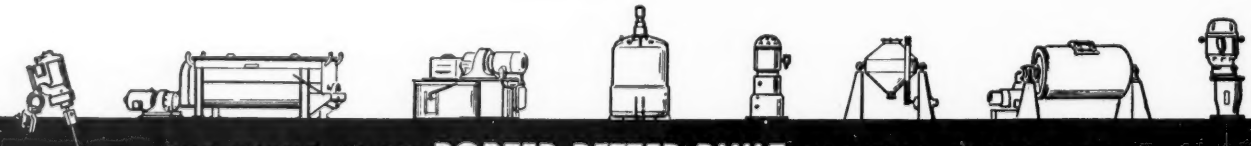

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THE COVER

Because of its importance in the process, temperature is controlled and recorded in the evaporated milk plant of Sheffield Farms Co., Inc., at Walton, N. Y. The picture on the cover shows an inspector checking the temperature charts on the instruments connected to the stainless steel evaporators.

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How to detour the "waiting" room

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Reconversion *and* Contract Termination

American industry is dedicated to an all-out effort to achieve victory, and its good faith in this direction is amply demonstrated by the results.

American industry also is dedicated to making democracy work effectively after the victory. And it is toward this objective that industry must prepare itself to guide the processes of demobilization and reconversion in order to minimize the dislocations and chaos which too easily can result from so tremendous a task.

We exercised foresight from the very beginning of the war mobilization program. Let us now exercise foresight in the approaching changeover from a wartime to a peacetime economy.

The first step in converting American industry from military to civilian production is the termination of contracts between the government procurement agencies and the producers. There are now in force war contracts amounting to tens upon tens of billions of dollars. As the demand for weapons of war decreases, the Armed Services will undertake to cancel contracts. With the emphasis shifting from weapons of one category to weapons of another category, many billion dollars worth of contracts already have been terminated. It is hoped that the experience now being gained in this work will provide the basis for effective and sound procedures when an avalanche of cancellations comes later.

Many complex problems involved in the termination of contracts will materially influence the success of the entire reconversion program. Once war demands fall off sufficiently to permit the renewal of civilian production, we will have to act with great speed if we are to avoid large-scale unemployment. Prompt financial settlements of contracts and the rapid clearance of plants are of immediate and great significance. In many cases the removal of equipment and raw materials will be more important than money payments. The allocation of raw material for civilian production will be of paramount importance.

Government agencies obviously must exercise great care in spending the people's money and in protecting the interest of the public against excessive payments. Unjust enrichment at the expense of the people will not be condoned nor will it reflect favorably upon management to present inflated claims. But long-delayed negotiations, which will retard the initiation of civilian production, likewise must be avoided.

The contracting agencies and the manufacturers both know that the greatest losses in the reconversion period will result from delays in getting peacetime production under way. The

greatest potential wastes lie in unemployment and in idle plants. The magnitude of such losses to the public can be far greater than the money spent in liberal settlements; to the manufacturer, these losses can represent vastly more than the extra funds that might result from interminable litigation. Policies must be firmly established ***now*** whereby the manufacturers, including subcontractors and suppliers, will receive substantial settlements immediately in order that ample funds be available for reconverting plants and accumulating necessary inventories of peacetime goods. Nor must we overlook the fact that the uncertainty of long drawn-out disputes will have a stifling effect on enterprise and that final settlements, therefore, should be made as promptly as possible.

Plants that are equipped largely with special wartime tools and machines and that are fully stocked with materials, components, and finished military products will not be able to undertake any substantial degree of conversion until this machinery and this inventory are removed. Advance arrangements are essential for the prompt clearance of great numbers of plants the country over. Adequate warehousing facilities must readily be available so that the changeover to civilian production will not be hampered.

As war demands decline, civilian output will be resumed; and while we recognize that the demands for munitions must vary as the strategy of the military leaders is changed, it is hoped that the Armed Services already have or soon will develop schedules of their continued needs under different strategic assumptions. If we know in advance the probable curtailment in war requirements we are in position to estimate the timing and the quantities of raw materials, the number of workers, and the industrial facilities which will be available for peacetime purposes. It will then be possible to integrate the lifting of restrictions on civilian production with the drop in war production.

Needless unemployment and idle plants will prevail if restrictions on the output of civilian goods are removed at a slower rate than available manpower, materials and plants permit. On the other hand, if the controls on civilian production are removed prematurely or too freely, then the production of military requirements will be hampered correspondingly. There will be great clamor and pressure for eliminating all restrictions as soon as any measurable quantity of materials and numbers of workers are freed from war work. It will react adversely on industry as well as on government if these pressures are heeded indiscriminately, thereby retarding the production of munitions for our boys who still will be fighting and dying at the front. The coordination of declining war demands with increasing civilian production probably is the most difficult and at the same time the most important task in our entire reconversion problem. Advance planning and sound judgment are essential.

An order of priority for initiating non-war or civilian production must be prepared beforehand. The schedule of resumption of peacetime production should be governed by the amounts of

materials, manpower and facilities that are available as well as by the relative needs or importance of different products. There will be strong competition for priority among the various kinds of consumer goods, equipment needed for reconversion, producers goods required for expansion and modernization, and export demands. Relative need obviously is the most compelling criterion. But because of the importance of expediting reconversion, earliest consideration is urged for the tools and fixtures and models which will expedite large-scale civilian production when adequate labor and materials are available. In any case, advance schedules will be needed to avoid a makeshift, piecemeal lifting of controls on the basis of who shouts the loudest.

Another difficult problem of the reconversion period will be to keep to a minimum the distortion of inter-industrial and intra-industrial relationships. Many varieties of consumers goods compete for the consumer dollar, and some industries will offer strong resistance if the green light is given first to industries whose products may thereby acquire a time advantage.

Even more difficult will be the matter of competition between companies producing the same products. Some manufacturers may find themselves tied up with continuing war contracts with restrictions on their peacetime products suddenly lifted and their competitors free to take advantage of the situation. The declining need for different kinds of war materiel will vary greatly, and some producers inevitably will be available for peacetime production considerably in advance of some of their competitors.

This raises the question of victory models or nucleus plants to eliminate competitive advantages among producers of identical products pending the time when all are on an equal footing again. Policies controlling this should take into account the degree or the extent of competitive advantage which reconversion might bring, and also upon the time interval during which these advantages will prevail. Such programs necessarily mean increased government control, hence they should be adopted only under the most pressing circumstances.

There is the important question of termination as between large and small plants. Fairness must be exercised, and undue advantage to either group must be avoided in extending opportunities to continue receiving profitable war orders or in getting back into civilian production. The problems of small manufacturers must not be neglected in this period. Likewise, any restraints on new ventures and on more vigorous competition must meticulously be avoided.

There also is the question of communities which have been greatly enlarged and others which actually have been brought into being by the war. It might be advisable to terminate contracts in these areas first in order that the workers might be encouraged to migrate elsewhere while employment prospects are most favorable. Also, if continued production of some armaments is contemplated after the war, it might be well to concentrate this production in communities which otherwise would be stranded.

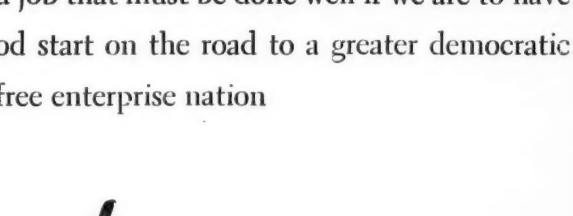
If the process of terminating contracts is to be geared into meeting continued demands for munitions and also expediting reconversion, then the Armed Services must accept broad policy considerations as criteria for cancelling contracts. Procurement officers might be inclined to cancel contracts with all high cost producers first. Or they might be inclined to cancel small producers first so as to reduce the administrative burden. Then again, they might cancel the newer producers of specific products rather than the older, time-tried manufacturers.

These procurement criteria may all be highly desirable and efficient but other important considerations such as those mentioned above must be given proper attention. ***Demobilization cannot be a separate process from reconversion.*** They must be united. The termination of contracts is a demobilization task, but I am confident that the procurement agencies appreciate the importance of this operation in facilitating reconversion and that they will take full cognizance of the policies necessary for giving every assistance to initiating peacetime production.

I have not attempted to raise all the important policy questions in terminating contracts, nor do I propose specific solutions for each major problem. Rather it has been my purpose to indicate the complexities of the task which faces us and to urge that intelligent and sound plans be developed now while there is time. By so doing, we can avoid the dislocations and economic disorder which otherwise might characterize the reconversion period. The better we are prepared, the more rapid will be the resumption of full employment and good business after the war is won.

This job of changing America's industrial pattern from war to peace speedily and efficiently, is one which will tax the talents and knowledge of the ablest business men of the country. These men can, and I am sure that they will, attack this task with the same energy and determination that characterized their efforts in the period of mobilization for war.

Industry advisory committees were established to cooperate with governmental agencies in the great task of conversion to a full war economy. These committees are the means through which industry has the opportunity to play a major role in the solution of the problems of reconversion. It must assume that responsibility or accept the consequences in the form of enforced government control. Industry must take a renewed interest in these committees and make certain that our best minds and strongest men are available for the challenging job of conversion which we face now. It is a job that must be done well if we are to have a good start on the road to a greater democratic and free enterprise nation



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Postwar Preparation—VI

The New Philosophy of Management and Ownership

A HALF-YEAR has elapsed since military events in this war began to prove conclusively that its outcome is to be a victory for the United Nations. During this half-year these pages have counseled that businessmen should be thinking about what their activities shall be after the fighting stops. But the time has now come for something more than planning. Planning must advance to preparation. Plans must be reduced to a definite program of action.

There is, however, one exception to the foregoing. This exception is in the field of the moral and spiritual preparations which each of us must achieve to be of maximum service to mankind in the days when we shall stop killing each other and destroying each other's possessions and life works. This is not to deny that the ruthless enemies deserve everything they are getting. They asked for it. They forced total war. Let them and their evil works be destroyed. But let us not go down with them.

No one must ever forget that Adolf Hitler was enabled to gain power by so-called hard-headed, realistic business men. Hitler was originally financed by German industrialists, such as Fritz Thyssen, because they thought they saw in Hitler the sure antidote to a growing communistic movement. Thyssen, like many another business man, is now a prisoner in a German concentration camp. Hard-headed realism went just as far astray in Germany as it would have done had it decided to do nothing for the relief of acute economic distress among the masses of Germany in the late 'Twenties and early Thirties. The industrialists financed and encouraged a fanatic to safeguard their own economic position, and in the end lost property, freedom and in many instances their lives. Whether they would have fared differently had the communistic movement gained the ascendancy is a moot question. In my humble opinion they would have lost out whichever of these two courses they might have sponsored.

I have carefully avoided designating the preceding courses of possible action as alternatives, for I think either of these courses was merely the alternative to a course of action that should have been taken by big business in Germany in the 'Twenties and thereafter. The untried alternative was the principle of doing all possible to aid the working masses even at the cost of relinquishing a large part of their own cherished rights and possessions.

There is a disquieting similarity between the private armies of Brown Shirts and Black Shirts of Fascism and certain private "armies" inside the United States which respond to the dictates of another type of selfish leadership. To be sure, our own private "armies" wear only a button of identification, not complete uniforms. But they are no less powerful, though they use different weapons. One of them has twice stopped the entire coal production of the nation in the midst of the most terrific war in history. Others have halted the production of leather, munitions and warships, and so on.

Business in the United States did not finance these huge and powerful private armies that periodically tie the nation in knots. But unenlightened past business policies must accept a share of the responsibility for the situation which called forth the reactions which have led to these problems. Yet there are some very successful businesses that operate in areas of the greatest agitation without being affected in any way. In fact, on different occasions I have heard three labor leaders of national prominence say that, if all businesses were run in a comparable manner, there would be no reason for the existence of a labor union; that the management was doing far more for its employees than any union could possibly do for them.

Among world figures and statesmen there is emerging a new principle that I believe will become a dominant principle in the future. I have no notion of who first stated it, but when a friend discussed it with Joseph Stalin he (Stalin) instantly agreed. The principle is this: No form of government can long endure that does not constantly raise the standard of living of its people.

If the United Nations apply this principle in the postwar world, it is obvious that it only can be put into effect by the actual deeds of employers. Many employers do it already, but not enough of them are imbued with the spirit of a constant raising of the standard of living of their employees to make it general.

In these historic times we are all participants in world-shaking events. Something much bigger than any one person, bigger than any one nation, is sweeping us onward toward an unidentified destiny. No man, no corporation, no nation is powerful enough to stem this mighty tide which is carrying us far from a past that we knew to be a future that is only dimly discernible. That this future will differ considerably from the past is apparent to all men who can really think. What it will be like is, I believe, suggested by the new principle which men who today direct world affairs are pondering.

Obviously something new is coming into our lives. We can adapt ourselves to it—or we can feebly oppose the vast forces that engulf us and be swept away to the limbo of forgotten things.

In preparing ourselves and our affairs for the days of peace there is no more important step for top management to take than to think this problem through. To oppose change thoughtlessly will be fatal.

L. V. Burton EDITOR

The Talk of the Industry

• WM. R. SCOTT, Director, The Realistic Peace League of America, Pasadena 1, Calif., has sent us a postcard saying: "Mothers, the next war is cooking! We took Puerto Rico with 950,000 population. Gave freedom from want; now a 2,000,000 population. Our sentimentality caused 1,050,000 increase. Now Tugwell is there stimulating the birth rate so we will feed more millions! . . . "

Hm-m-m. There must be more to Rex than meets the eye.

• ONE of the disconcerting bits of news is the frequent offer by the War Food Administration of food for sale. Take, for example, nineteen lots of pea beans at Toledo, totalling over 10,000 bags, all of them "out of condition (suitable for animal feed)", or 17,000 cases of shell eggs in New York and no bidders.

• DESPITE all the changes in OPA's top personnel, letters and reports continue to come to this office showing that OPA and WFA don't get together on prices of raw materials for food processing until it is too late.

Where the raw material is sold on the open market without price ceilings it is absurd to think that food processors can buy it when they must operate under price ceilings—ceilings that sometimes are to be announced at a later date. As usual the consumer market runs away with the bulk of the supply simply because it operates without much restraint. Latest complaints have come from Florida citrus processors.

While OPA has not exactly endeared itself to us, we believe that the trouble lies in Judge Fred Vinson's office of Economic Stabilization. His outfit has dallied plenty of times to the detriment of the processor. The judicial mind may be all right for abstract justice, but crops keep on maturing and disappear while Hizzoner ponders.

• ONE of the reasons why Charles F. Kettering remains one of the outstanding researchers of the day is his complete freedom from intellectual hideboundness. Here are a few of his gems of salty wisdom from a recent address before American Society of Mechanical Enginners.

"An inventor is a guy who doesn't take his education too seriously."

"Logic is an organized way of going wrong with confidence."

"We must teach the college-educated boy how to fail intelligently. It is no disgrace to fail. The only time you don't want to fail on any experiment is the last time you try it."

"Tediousness is a thing you must learn to endure and like, and not resent because you have an education."

"Very much greater protection than any patent is to have your competitor think you're crazy, because he won't pay any attention to what you're doing as long as he knows you're crazy."

• AN interesting Sunday pastime is to count the number of columns of ads for Help Wanted—Male in a big metropolitan newspaper like *The New York Times*. In the depths of the depression there were about 20 to 24 columns each Sunday. In the sp of 1943 there were more than 60 umns of such ads. About Septem the number began to decline. December 12 it stood at 32. Wh really means we are unable to sa

• OPPORTUNITY: Bacteriologists w a flair for mass production techn should be made aware of the urg need for equipment for large-scale ture of molds. One maker of p cillin now uses 10,000 two-quart bottles for his cultures. He rig believes that about 10 suitable u ought to do the same job, except they are still to be invented.

• RUMOR has it that OPA folks pretty sore about taking the rap compensating for errors of judgm by WFA. Gossip says that so much criticized prices by OPA w merely to pull the WFA chestn out of the fire, or to salvage an a ward WFA situation. OPA, acc ing to the tale, is not having any

Hors d'Oeuvres

• In his travels in Africa, Ernie Pyle came across an American civilian who gives his chickens a spoonful of gin before killing them. The reason—to relax their muscles and make them more tender and succulent. Perhaps there is a point here for poultry packers. A shot of Jersey lightning should do as well, and it would also singe the pinfeathers.

• *The combination of fruit acids and high pectin content in cranberries produces quick stamina and alertness. So it was the cranberry sauce that enabled you to walk away from the dinner table on Christmas.*

• When you speak of a meat substitute to a meat man—smile. The meat industry is a bit perturbed about claims for high-protein vegetable substitutes for meats. The funny part of it is that the meat men are right. Meat has the best balance in amino acids. Besides, it's the only thing that tastes like meat.

• *Vitamin C will help you to withstand the shock of injuries, recent tests with guinea pigs indicate. If you anticipate being hit by a taxi, better drink orange juice regularly.*

• More food for hungry peoples is the cornerstone of the "freedom from want and freedom from fear" postwar program of the Allies. So those who produce and process foods have the opportu to do more for civilization than all great statesmen, inventors and explorers have lived since the world began. A of people have forgotten what is the important thing in the world.

• *A nation-wide survey indicates that percent of the housewives have changed food buying habits. Wonder how the 15.2 percent are getting away with it?*

• Advertising geniuses sometimes show good sense, as in the case of the wine pany which tells the people to buy product but not before they buy war bo

• *Good news?—Restrictions on civilian of castor oil have been lifted for months.*

• In 1720 Gabriel Mathieu de Clieu s from France to Martinique to bec governor. He took with him a c plant. On the voyage water ran short was rationed, but de Clieu shared his dribble with the little coffee plant. was tortured with thirst, but both he the plant survived. Martinique bec a great center for the cultivation coffee, which later spread to S America. If de Clieu were alive t he might be a little surprised at thirst for that second cup. F.K.

anpower is the canner's number-one problem, because the plants e principally in rural areas where there is not enough additional help to draw on. As this picture indicates, many workers are required for the preparation and inspection operations.

CHALLENGE TO GOVERNMENT

Misdirected efforts of Federal food agencies have hurt the morale of canners and made them dubious of promises for 1944. Here a canner explains why and tells what ought to be done

By F. A. STARE,
President and General Manager, Columbus Foods Corp., Columbus, Wis.

TWO serious and far-reaching overall problems exist in the canning industry. In the first place, the canners are suffering from the kicking around they received in 1943 at the hands of government agencies, so that their morale is at a distressingly low ebb. Secondly, a practical program on the part of the government is badly needed if the industry is to produce enough canned foods to meet wartime demands. Reflecting the latter problem is the fact that reports from many of the canners who have contracted growers indicate a definite trend toward smaller plantings in 1944. This trend stems from the shortage of labor experienced in 1943 and the fact that it will be worse this year.

To improve the morale of the canners, it is going to take a lot of right about face, hand shaking, back slapping and making good on at least a few promises by the contact men in several government agencies.

Those of us who come in contact with a few government men who understand our problems realize that the industry is indeed fortunate that these men stayed on when the going was so bad a year ago. But the rank and file of the industry do not have these intimate contacts, and many feel that all government men are alike—petty tyrants, little men in big jobs, who are arrogant, domineering, demanding and utterly lacking in understanding.

Governmental regulation of the canning industry got off to a bad start for 1942. For reasons beyond their control, the contact men from various departments were unable to come through with any plans at the ill-fated December, 1942, conference in Chicago or at the various state meetings as late as January and February, 1943. The canning industry, scattered through 40 states, was expected to contract for acreage at some unknown price and make plans for processing products to be sold at prices which might or might not reflect the increased costs.

"The policies of the OPA so far as they relate to the canning industry and the distribution of its products were (evidently) formulated by persons whose indifference to the opinions of the leaders of the industry was equalled only by their ignorance of its problems."

Time To Plan for 1944

We are approaching the time when planning for 1944 is essential. Once again the canning industry finds itself caught in a cross-fire between the probability of paying more for canning crops, labor and supplies and the necessity for preventing higher prices and inflation. As yet there seems to be little in the way of coordination of effort among the many agencies which have jurisdiction to regulate some part of the industry's activities.

The low morale of the industry is what one might expect of manufacturers who have in many cases sustained substantial losses because of conflicting governmental rules and as yet have been given no assurance of recovery. Many canners feel that their industry has been singled out for discriminatory treatment even within the limits of announced policies. Let me give you two illustrations:

When it was determined to subsidize the production of butter, a definite payment of 5 cents per pound was offered to each producer of butter for each pound of butter produced each month, and monthly payments were promptly made. When the time came to consider how the canners' increased expenditures for labor were to be reimbursed, a long and confused directive was issued. In-

stead of specific payments, a complicated formula seeking to measure prewar profits was suggested. And even this formula, which would involve reports and accounting far beyond the command of the average canner, is still being debated and discussed and considered in Washington.

Another illustration may be found in the attempt to impose upon a vital war industry, which was called upon for increased production, a series of incomplete and unenforceable government grades which would have required most of the canners to change completely their methods of doing business.

There can be no whole-hearted cooperation from growers and canners in 1944 if the mismanagement and errors of 1943 are not corrected.

Growers make their plans for crops months in advance of planting time—they have to know now what the support price is going to be, not sometime next spring. They have to know now whether positive planning for their necessary labor is assured. Canners who were flim-flammed out of portions of the subsidy to cover the increased price to growers in 1943 are not going to be caught in the same trap in 1944.

Pea canners in 24 states are getting only a part of the increased price they were compelled to pay to growers—in 18 states they received full compensation and in a few states, or portions of states, they are receiving even more than the full subsidy. In eight states the recovery is less than one-half of the increase ordered. Canners of other products have similar grievances.

The flat regional price ceilings for peas, figured by people in OPA who had had no experience in the industry, were based on 1943 labor costs, with the stipulation that any increase in labor resulting from increases authorized by WLB were to be added. These prices were in many cases much lower than the 1942 ceiling prices arrived at by formulas, and in some cases the squeeze, together with the failure to pay full compensation for the grower increase, has put canners into the red.

The President's hold-the-line order in April and the failure of the Director of Economic Stabilization to allow the subsidy for the increased labor, except upon establishing a hardship, has bewildered and angered the industry. If the canner made a small profit he had to stand the labor increase himself, which was not the intent of OPA when the prices were announced.

The purchase and resale contracts from CCC disclosing the double crossing in the matter of the subsidy for growers' price increase were not sent out to the canners until long after the planting season, when it was too late for canners to cancel contracts with growers. This injustice has not been forgotten, and those canners who paid the growers the full increase, because *their* word and contract *is* good, are not likely to blindly accept the word of the government, either spoken, written or published. They will demand a signed agreement before contracting or planting acreage in 1944.

There is some reason to believe that in several of the agencies in Washington there will be a change of policy and that plans will be formulated, not by lawyers and professors, but with the council and aid of people who have had some experience in the industry. There have been a number of important changes in the personnel of some of the agencies, particularly in OPA, and canners generally feel that a new day is dawning wherein the agencies are working more closely with each other and the advice and council of men from industry not only are needed but are much to be desired. Gone is the contempt in which some of those, who happily are no longer there, formerly apparently held towards industry.

Encouraging, too, is the fact that some of the men who know our problems, but who lacked authority, stayed on and kept their eyes on the ball even though the umpire called wrong decisions far too often. These men were ready for industry men to participate long long ago, and were it not for the battle between Congress and the Administration on subsidies (still undecided as this is written) the Processors Conference would have been held in December.

The industry, however, is not standing idly by but through the medium of numerous state, regional and commodity groups has been passing on its ideas and demands for consideration.

Here are a few of the recommendations of Wisconsin Canners Association:

> Manpower on the farm (and in the factory) is relatively more important than raw product prices in determining what canning crop acreage can be planted in 1944. . . The industry reiterates its opinion that subsidies to reduce or prevent increases in consumer food prices are economically unsound, but if subsidies must again be employed, they should represent the actual amount of the increase in raw product prices between 1942 and 1944 without so-called adjustments. . . Canners should not be required to make firm commitments to growers at support price levels, unless the government also guarantees comparable support prices on the canners' finished product.

The Tri-State Association, the Pennsylvania Association and several others have either filed or will file suggestions with FPA and make similar suggestions to the NCA committee.

The following report of the NCA postwar planning committee was introduced and read and made a part of the records of the Industry Advisory Committee at the November 8 meeting:

"In planning their 1944 production, individual canners must pursue one of two courses. They may determine the commodities they will pack, and the volume of each according to the individual canner's evaluation of potential demand, and his ability to sell at a reasonable return. Or they may comply with a governmental request for all-out production, within the full limits permitted by weather and uncertain labor supply.

"If each individual canner is to act in his own self-interest or that of his company, he will necessarily have to take into consideration the present uncertainties with respect to the time that hostilities will cease in Europe, the extent of government holdings of canned foods and the time and method of disposition, the possibilities of government reservations being substantially and rapidly reduced before being actually purchased, and other factors controlling the possibilities of serious loss on his 1944 pack.

"If, on the other hand, he is to forget his own economic welfare and abandon his own judgment as to business hazards, and those which may flow from future government action, and, instead, to produce the largest possible 1944 pack of those products desired by the government, there are a number of conditions which must be met if all-out maximum production is to be obtained.

"These include many points not here considered, such as early knowledge of the government requirements, the 1944 price ceilings, the containers to be made available and the like, but primarily, there must be a restoration of confidence in government commitments.

"The following conditions, however, seem fundamental to getting such all-out production. To the degree that they are not obtainable for 1944 there will undoubtedly be a failure to achieve the production goal which may be set.

"**1. Stop-Gap Support Price.** If the government desires all-out production of specified seasonal canned fruits or vegetables there must be a floor or support price for each such product.

"This price floor must cover that portion of the pack of each such product which is not set aside for direct government purchase.

"The sole purpose of such support price is to serve as a stop-gap on ruinous liquidation of the all-out pack which the canner is asked to produce.

"The commitment of the government to purchase at the support price must be contained in a contract with specified provisions as to the time of purchase and of payment. In addition, such contract must provide that the government will not in turn resell for domestic consumption such goods at less than the support price, and that if it does resell for domestic consumption it will do so only through regular trade channels. The government will, of course, be free to dispose of any surplus for relief or for other noncommercial purposes such as school lunches.

"**2. Definite Contracts Covering Pack Reservations.** As to those portions of the pack which are directed to be set aside and held for direct Army purchase, there should be a definite and firm contract to buy.

"Since these reserved goods are to be specially packed for governmental purposes—as part of a pack of largest possible volume—the contract should not be subject to cancellation. What is to be packed for the Army should be taken by the Army.

Manpower in the plant is not the canner's only labor problem. There is also a shortage of help for growing and harvesting the foods, and that is one of the difficulities to overcome in 1944. The picture shows workers harvesting spinach.

"Any support-price program serving as a stop-gap on drastic liquidation will be defeated if government-held stocks are dumped on the market. Consequently, the contracts covering the purchase of the reserved portions of the pack must likewise provide that the Army or other government agencies will not resell such goods for domestic consumption at less than the support price for such product and that, if the goods are resold, such sales will be made only through regular trade channels.

"3. **No Renegotiation.** There should be no renegotiation of any contracts for the sale to the government of regularly manufactured seasonal canned foods.

"4. **Knowledge of Existing Government Stocks.** The deterrent effect, upon production, of existing apprehensions and fears as to the size of canned food stocks held by the government cannot be too strongly emphasized. These are largely fears of the unknown. They are not lessened by sudden release or return to civilian consumption of a large number of cases of earlier years' packs. Such apprehensions can be dissipated by making known to the industry the size of the existing stocks held for military and other governmental purposes. Since the size of the Army and Navy are now public information, as will be the size of the pack reservations for 1944, the size of the present government holdings of canned foods does not seem to be information which must be withheld for reasons of military security.

"5. **Payment for Carrying Charges.** Under present government contracts, canners are obligated to hold goods for very long periods. They are absolutely responsible for such goods even after they become government property, and pay all storage, insurance and other carrying charges. Provision should be made for the payment to canners of all such charges accruing after 90 days following the completion of the pack of the reserved goods."

Thus government will find industry united and ready and willing to go forward in 1944, but the canners insist that the decks be cleared for action and all unnecessary and needlessly cumbersome barriers jettisoned, so that the industry will have a better chance of survival.

Industry will and should require, among other things, the following:

1. Early knowledge about growers' support prices and comparable price ceilings reflecting all cost increases since 1942 on all commodities (no more short changing on subsidies for crops or reneging on increased costs of labor).

2. A guarantee from the government of a support price for the entire pack to reflect at least the approximate cost, as this would encourage full production since the canner and distributor would have freedom from fear (of loss).

3. Instead of a mere "set aside" order with no obligation on the part of the government to take a single case, there must be a firm contract, including a provision that no portion will be sold by the government for domestic use at less than support prices, and only through regular trade channels.

4. Before industry is required to expand 1944 operations, government and industry should confer, with full knowledge of government-owned stocks—distributors' inventories—and household supplies, both commercial and home canned.

5. The government should pay carrying charges (storage and insurance) beyond 90 days after the respective packs.

6. AMA grading has not been entirely satisfactory, because lines of demarcation between grades are not properly synchronized with commercial practices, and some graders consistently grade lower than some others. The system should be revised and made more satisfactory, as much friction is caused by misunderstandings between canners and some government graders, some of whom are arrogant, insolent or surly.

The Number-one Problem

The canners' number-one problem, however, is labor. Our plants are mostly in rural areas, in small villages and towns where everybody knows everybody. And we know now, just as we knew last summer, that every able-bodied man, woman and child old enough to work legally would still not be enough.

Many of our trained key men—in some cases all of them, including plant superintendents—are either in the armed forces or working elsewhere at much higher wages than canners were permitted to pay. More than half the farming is now being done by men and women more than 50 years of age for the same reasons. Life is too short to willingly go through another such nightmare as that experienced by most of us in trying to get labor for field and factory.

If the production and processing of food is of paramount importance—and we all sincerely believe this to be true—then the government should assume the responsibility for supplying the necessary seasonal adult male labor to insure harvesting and processing of all perishable canning crops.

Some relief was had by those canners within commuting distance of Army camps, where soldiers were allowed to work on their day off. While this helped a lot, it meant breaking in new men every day and paying "portal to portal" time and the cost of transportation and meals, resulting in almost double pay for the hours actually worked.

But out of about 150 canneries in Wisconsin, not over a dozen were so located as to use volunteer soldiers on their day off. In some other areas, canners used prisoners of war on a day shift, but again they were available to relatively only a few because of location. In a number of states in the far west, Mexican nationals were employed with very satisfactory results. In a few instances Jamaicans were used in field work and sometimes in the factory.

Public Law 25 prohibited the use of imported agricultural workers in factories, and it would help some if this law was broadened to include first processing.

(*Turn to page 116*)

How Hormel Plans for Postwar

Careful organization of a planning division and systematic study of all projects help to prepare for full employment

Based on a recent address before Grocery Manufacturers of America made by
WILLIAM D. TODD,
Geo. A. Hormel & Co., Austin, Minn.

IF postwar planning is to amount to anything, the first task is to debunk it. It must be stated in terms that all can understand, and in terms of things that we, ourselves, are to do about it.

As we contemplate our postwar situation, our first conviction must be that if we are to be ready for the postwar situation, we must immediately start preparing ourselves.

What Is Postwar Planning?

To start with, postwar planning is just the ordinary kind of planning that prudent people always do. That is, they try to think before they are forced to act.

The only reason it is called "postwar planning" instead of just "planning" is that we all recognize that the end of the war will bring real changes in the lives of more people more suddenly than ordinarily happens. And, although we may not be exactly clear about what these changes will be, we do know that the signal for the changes will be the word that the war has ended.

Postwar planning is no more mysterious, and it is no more complicated, than the thoughtfulness with which any man in any walk of life may undertake to keep his affairs in order, not only for today, but for tomorrow. Of course, if you are thinking in terms of government projects, your postwar planning will be government projects. If you are thinking in terms of social reforms, your postwar planning will have to do with social reforms. But if you are thinking in terms of running your own business, you postwar planning will be in terms of your own business. If you are thinking in terms of your own job, your postwar planning will have to do with the kind of job you want as compared with the kind of job you can get, and your postwar planning simply will be trying to think of the best means of making the most of your own private, personal opportunity.

Postwar planning is just that simple act of giving some thought to the morrow.

Who Should Do Postwar Planning?

If the Axis wins the war, postwar planning will be done by Japan and Germany. If the Allies win the war, the postwar plans we will use will be the plans of the people—the plans of all of us—the composite of our individual plans, and our joint plans.

Actually, all we are fighting for is one privilege—the privilege of individual self-expression. When we talk about the freedoms, we only mean the freedoms of the individual—the freedom to act. If we expect to get much satisfaction from our freedom to act, we shall have to give some thought to what those acts shall be.

But here I want to make two points. We must not let all this planning be done by big business. And all business planning should not be done in the front office.

We must not leave all the planning to big business because, regardless of the large number of people to whom these larger companies give employment, we must not forget that it is the rest of us who furnish the customers to make that employment possible. If you and I don't get our planning so done that we can be good customers, all the plans they make will fail.

And all the planning should not be done in the front office, because much as those who sit in front offices would like to think so, the fact is that front offices have no patent on brains, ingenuity and on that resourcefulne which American freedoms foster.

Postwar planning is a job whic should be undertaken by every Ame can with respect to his own niche American life. Every man with a jo should be planning his own saving an spending program, and should be co tributing what he can to the planni that surrounds his job. Every man i business should be planning to mak sure that he stays in business, or th he perhaps may make a job for a ma or two besides himself. Every man wh has one or two or eight employee should be planning to protect that em ployment and, if possible, to add to i to make a place for one or two or eigh of the people who will be coming bac from our armed services or from ou war plants.

If each of us, operating on a sma scale, should succeed in so plannin our own activity as to maintain ou own jobs and buying power and, in ad dition, find places for our share of th people whose jobs must change whe the war is over, General Electric, Ge eral Motors and the rest of the big boy won't need to do any planning at all We will automatically make for them more business than they can handle.

How Hormel Plans

When we undertook the job of plan ning in my company we were confused and bewildered as to how to start an what to do, and I am sure that thos of you who have planning underway i your organizations must have had th same difficulty. We found it difficul "to get our teeth," so to speak, int anything concrete as we were in th habit of doing in normal times.

A Planning and Coordinating Divi sion, as shown in Fig. 1, was set up an charged with the responsibility of orig inating and developing projects and fo spurring the division heads and com mittees who must carry out the details

First, the most careful possible esti mates were made, division by divisio throughout the company, of probabl employment in each of the three year following the war, as shown in Fig. 2 the Job Graph. We feel that for fiv years after the armistice the food busi ness will be called upon to produce an even greater volume of product than they are now producing in order to re habilitate virtually the rest of the world

e think this will take five years, but be conservative we decided to use ee years. We feel that while our dustry is doing this job the durable ods industry will be converting. hether you agree with this thinking not, or the policy, it is our studied inion that this is about what will ppen.

After this Job Graph was completed nd it is kept up to date each week), then began to search for ways and ans of increasing these estimates. In neral that meant looking for new and ger opportunities for the company market its meat products, which in n can mean more and better jobs in r company. The Planning Committee died—and continues to study—such oblems as development of new prodts, opening of new sales outlets and tter use of waste materials. When we me upon a project that seems to offer od possibilities, that project is referred to the appropriate department of the company for processing.

In considering a new product, for example, such suggestions as materials, machinery, building, distribution and manpower are all involved. Under the heading of distribution, consideration is given to sales quotas, consumers, equipment and advertising. And as to the product itself, such matters are considered as patents, prices and packaging, and complete market analyses are made.

Then the reports go back to the Planning Committee. If the committee decides favorably we place the project under what we call "operating" and it is kept alive and developed against the day when it will be put into effect. A project disapproved by the committee is not permanently dead, but is added to the list of "Projects Pending," because what does not seem feasible today may appear practicable six months hence. In some cases, even the names of workers on future projects and where they are to come from are specified. The reason for this is that you will be nearer right if you do it this way, and we fully realize that when the time comes there probably will be many changes.

The Planning Committee is scheduled to meet Wednesday of every second week. In the meantime, short reports are accumulated on each operating project every Friday, copies of which go to the executive committee each week.

We are basing our planning on the conviction that the readjustments which will come with the peace present practical problems, the solution of which will come from the same kind of teamwork, and the same caliber of thinking and planning by the same people who were able to convert a civilian industry overnight into a gigantic war production machine. We have employed no dreamers nor theorists to weave a magic carpet. No attempt is being made to out-guess or to "master mind" the postwar situation.

(Turn to page 116)

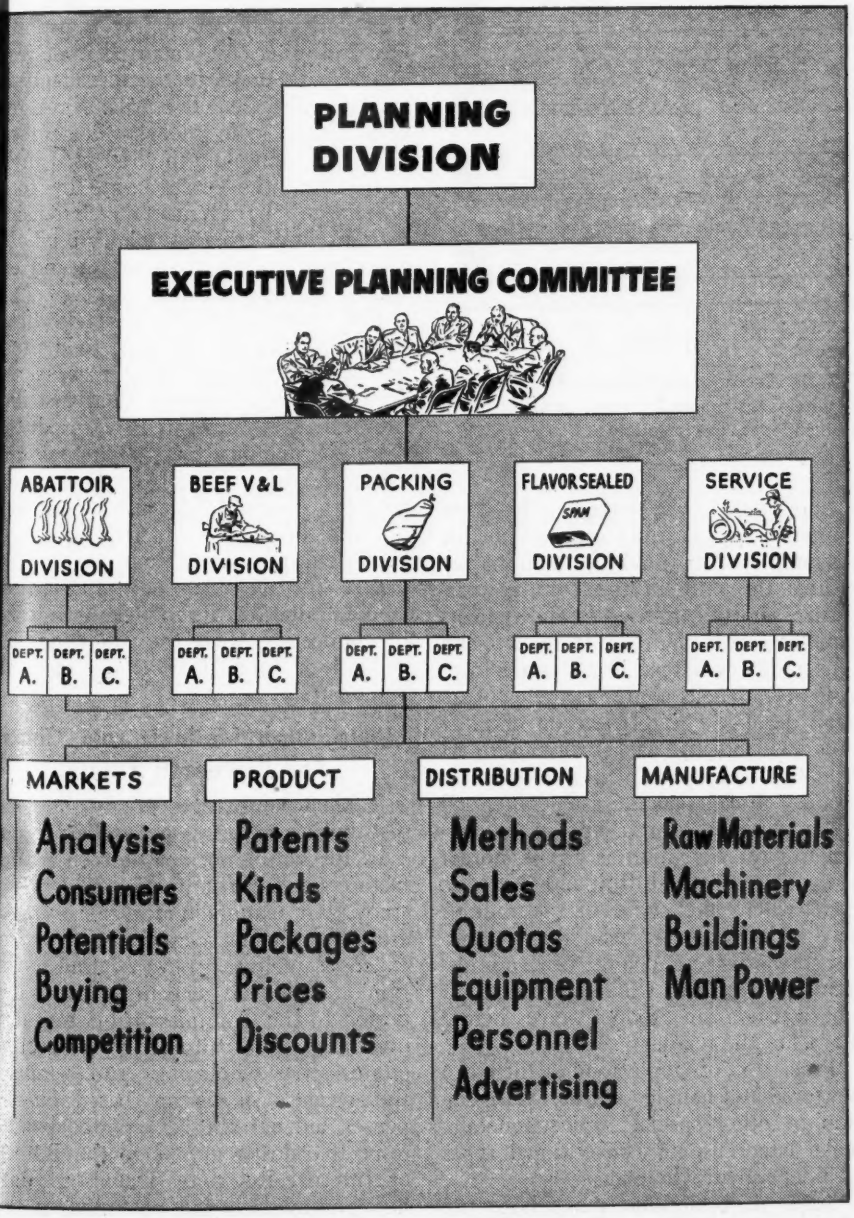


FIG. 1. Organization chart of the planning division of Geo. A. Hormel & Co.

JOB-GRAPH

DIVISIONS	TODAY	194X	194Y	194Z
ABATTOIR	1066	1232	1232	1232
BEEF V&L	461	466	466	466
PACKING	1125	1013	956	843
FLAVOR SEALED	541	426	343	316
SERVICE	446	446	446	446
OTHER	1492	1492	1492	1492
ON LEAVE	1321	—	—	—
TOTAL	6452	5075	4935	4795
	SO FAR	439	439	439
	TO GO	938	1078	1218

FIG. 2. Chart showing prospective employment in each of the three years immediately following the end of the war.

PROJECT OUTLINE

PROJECT TITLE:
Subproject Titles
1.
2.
DATE OF INITIATION:
IMPORTANCE:
OBJECTIVES:
1.
2.
RESUME OF PREVIOUS INVESTIGATION:
METHODS OF PROCEDURE:
1.
2.
PERSONNEL:
BUDGET:

FIG. 3. Otuline of the sequence of steps followed in the "project method" of postwar planning.

What It Costs To Distribute Some Important Food Products

SECTION I—This summary of a report to Congress by the Federal Trade Commission shows average mark-ups between manufacturer and wholesaler, wholesaler and retailer, and retailer and consumer for a wide selection of foods

IN accordance with a resolution of the Federal Trade Commission dated June 27, 1940, an inquiry was instituted under Section 6 of the Federal Trade Commission Act into the methods and costs of distributing commodities in the United States. Part I, Important Food Products, of this inquiry has recently been completed, in cooperation with the Office of Price Administration. It presents data on the methods and channels of distribution, and the costs of distribution incurred, by a sample of representative processors of selected food products, together with similar data for samples of typical wholesale and retail distributors. The following summary, based on the official text, should prove useful to food manufacturers in general, enabling them to compare their costs to the averages determined by the Commission.

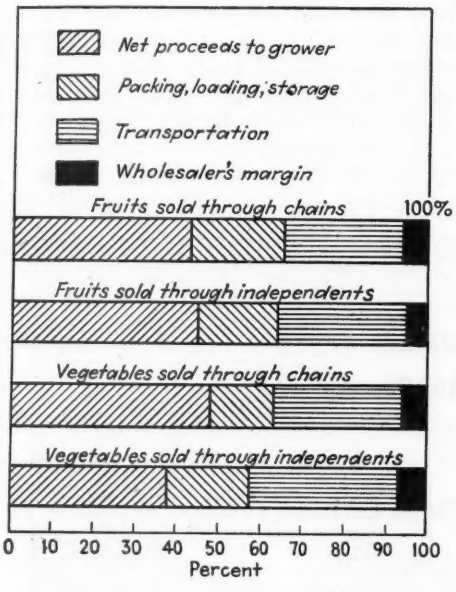


FIG. 1. Average distribution costs included in wholesale prices for sales through chain and independent retailers.

Channels of Distribution

The food products covered by this report on methods and costs include biscuits and crackers, bread, coffee, flour, milk and milk products, packaged cereals, cane and beet sugar, canned fruits and vegetables, fresh fruits and vegetables, and meats.

All of these commodities ultimately become parts of the stock in trade of food retailers. The channels of distribution through which they pass in reaching the consumer, however, vary widely. Some follow simple and direct channels and reach the consumer bearing relatively small charges for distribution. Others follow devious channels and reach the consumer bearing such high distribution charges as to indicate that marked savings might be made by reducing the number of handlers and charges interposed between the producer and the consumer, and by eliminating uneconomic practices, without impairing the ability of the trade to satisfactorily serve the public. Where such savings could be accomplished, both producers and consumers would benefit.

Certain perishable food products follow more direct lines of distribution and pass through few hands in the distribution process. For instance, the dairy company serving milk and cream for consumption in fluid form normally gathers the milk in the country, pasteurizes, bottles, transports and delivers it in the city to the retail store or to the consumer's doorstep. The manufacturer of ice cream sells almost entirely to the retail dealers. The distribution of meat is largely from the packer directly to retailers or from packer to wholesaler to retailer. Bread bakeries generally sell either directly to retailers or to consumers. An exception is to be noted, however, in the fresh fruit and vegetable trade where the chain of distribution may include country assemblers, packers, forwarding merchants, city commission receivers and wholesalers through whose hands the product moves before it reaches the retailer.

Processors of staple foods which can be stored and handled without refrigeration or other special service generally make larger use of conventional types of independent wholesalers.

Sugar manufacturers make large use of commission brokers who sell to grocery wholesalers and retailers or to i dustrial users of sugar. Flour millers s directly to commercial bakeries as w as to grocery wholesalers and retaile Many fruit and vegetable canners s largely through brokers to groce wholesalers and retailers, and evaporat and condensed milk manufacturers s to wholesale and retail grocers of ma types as well as to bakeries and oth industrial users.

Nature of the Distribution Study

Except for fresh fruits and vegetable the scope of the study made of distrib tion costs begins with the costs bor by the manufacturers of food product This omits consideration of transport tion and other costs incurred in delive ing farm products to the manufactur of food products. The balance of th field divides conveniently for applic tion of the sampling method used int (a) Distribution costs borne by foo processors; (b) average merchandisi margins and expenses of food whol salers and (c) average margins and e penses of food retailers.

Few manufacturers of foods lim their production to a single food pro uct, and their accounting records se dom yield data covering their distrib tion expenses segregated by product Even for manufacturers, therefore, th expenses discussed are averages fo groups of products. Accounting record of wholesalers and retailers normall kept yield only average margins and e penses for all commodities handle These limitations are to be kept in min in connection with the following di cussion of food distribution method and costs.

Distribution Methods and Costs For Processed Foods

Table I summarizes briefly the tota distribution expenses per dollar of ne sales for sample groups of food manu facturers and distributors covered in th study. For manufacturers, the average are based on net sales and distributio expenses, including outward transporta tion and delivery expense paid as re ported to the Commission by the man ufacturers constituting the respectiv groups. For wholesalers and retailers the averages shown are based on ex penses and net sales as reported by the respective dealer groups to the Bureau of Internal Revenue. Details of data here summarized will be found in the body of the report.

The average expenses per dollar of sales for processors shown in Table I are the expenses incurred in disposing of their total net sales of all the commodities sold. Some of these sales normally may have been sold f.o.b. shipping point while others were priced on a delivered basis. Distribution expenses as reported by manufacturers, therefore, may not carry all of the expense of transportation to either the wholesale or the retail level. Likewise, at the wholesale and retail levels, the data shown are average costs for handling a great variety of commodities, some of which may have been purchased f.o.b. factory or other intermediate delivery point, and others purchased on a delivered basis.

Cane sugar refiners, producing standardized staple products for which there are no substitutes adequate in quantity, refine their products as needed, sell large quantities directly to industrial users and other quantity purchasers, make large use of commission agents to find purchasers especially in the wholesale and retail grocery trades, and spend little for advertising even though sugar is predominantly sold under refiners' brands. Beet sugar manufacturers, on the other hand, must manufacture their entire year's production in a comparatively short time after beets are harvested and must store their product for distribution throughout the year. Even though they sell and distribute in much the same manner as cane suger refiners, beet sugar manufacturers reported total distribution expenses per dollar of net sales nearly three times as great as those of cane sugar refiners in 1940. Much of this higher distribution cost is caused by higher transportation costs. Cane sugar is largely refined near seaport cities and near large centers of consumption, while beet sugar is processed throughout the vast interior section of the country and largely in the less densely populated sections of the United States. Consequently, beet sugar manufacturers reported considerable amounts for outward transportation while cane sugar refiners reported relatively little outward transportation.

When both cane and beet sugar sales and expenses are reduced to the more comparable basis of sales f.o.b. factory, beet sugar manufacturers still showed expenses per dollar of sales more than twice those of cane sugar manufacturers. An important item accounting in part for the difference is the relatively large amounts paid by beet sugar manufacturers for storage.

By contrast, biscuit and cracker manufacturers sell largely under brand names, advertise their products extensively, and they give larger service by delivering a large part of their products to the store doors of grocery wholesalers and retailers, and sell in smaller quantities per delivery than sugar manufacturers.

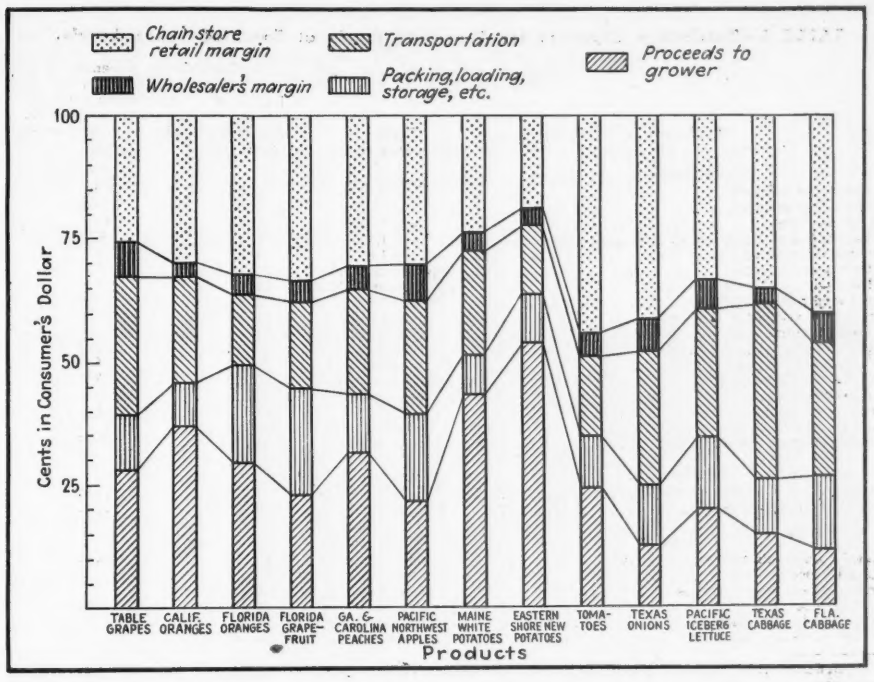


FIG. 2. Charges against the consumer's dollar, in cents, for distribution of selected fruits and vegetables.

Cracker manufacturers reported expenses about 8 times as great per dollar of sales as cane sugar manufacturers and nearly 3 times as great as those of beet sugar manufacturers.

Meat packers, who perform much the same delivery functions with respect to a considerable portion of their production of fresh meats and, in addition, furnish refrigeration up to the point of sale, had lower distribution expense per dollar of sales than beet sugar manufacturers, and only about one-fifth as much as biscuit and cracker manufacturers.

Comparisons based on sales and expenses with transportation excluded do not yield greatly differing results. Based on sales and distribution expenses, f.o.b. factory, the distribution expense of biscuit and cracker manufacturers per dollar of sales for 1939 were nearly 7.7 times those of cane sugar refiners, about 4.8 times those of beet sugar manufacturers and 5½ times those of meat packers. For packaged cereal manufacturers who reported the highest distribution expenses per dollar of sales, the showings are even more striking.

Analysis of processors' costs of distribution indicates that the principal factors accounting for the high cost of distributing biscuits and crackers are high expenses for salesmen's salaries and advertising per dollar of sales. In 1939 it cost biscuit and cracker makers 17.04 cents in salesmen's compensation to sell $1.00 worth of crackers as compared with 2.69 cents for cane sugar and 3.41 cents for meat packers. Advertising per dollar of sales for biscuits and crackers was 4.41 cents, as compared with 0.2 cents for cane sugar and 0.46 cent for meat packers. These two items represent 21.45 cents per dollar of net sales for biscuits and crackers, 2.89 cents for cane sugar and 3.87 cents for meats. For packaged cereals, which showed the highest total processor's distribution expense (34.93 cents per $1.00 of sales), more than two-thirds of the total was for advertising and miscellaneous "other distribution expenses." The other distribution expenses consisted largely of sales promotional devices such as samples, demonstrations, premiums, contests, and so forth. Cereal manufacturers spent an average of 7.67 cents of each dollar of sales for advertising and 17.42 cents for "other distribution expenses."

Ice cream manufacturers, who handle a perishable product which requires refrigeration service both during delivery to the individual retailer and while it is in the retailer's cabinet, reported total distribution expenses of 24.23 cents per dollar of sales, compared with 34.66 cents for biscuit and cracker manufacturers and 34.93 cents for processors of packaged cereals.

The general showing is that the processors of some products find it possible to distribute their products at low cost per dollar of sales even though, as in the case of meats, special refrigeration and handling services are required, while producers of other products, which, in some instances, are less perishable, incur much higher distribution expenses. Further analysis of the high distribution costs for items such as biscuits and crackers and packaged cereals indicates that they arise mainly from competitive selling and sales promotion

TABLE I—Distribution Expenses for Processed Foods at Specified Trade Levels.

Trade group	Period covered	Distribution Expense Per $1.00 Net Sales: Expenses as reported (cents)	Distribution Expense Per $1.00 Net Sales: Excluding outward transportation paid by manufacturer[1] (cents)
Processors:			
Cane sugar refiners	Year 1939	4.53	3.87
Cane sugar refiners	Year 1940	4.56	3.03
Meat packers	Year 1939	6.72	5.57
Evaporated and condensed milk manufacturers	Year 1940	7.13	[2]
Butter manufacturers	Year 1940	8.28	[2]
Chain store bakeries	September 1941	12.18	[3]
Chain store bakeries	September 1942	13.02	[3]
Beet sugar manufacturers	Year 1940	12.95	6.20
Fruit and vegetable canners	Year 1939	14.30	10.64
Cheese manufacturers	Year 1940	14.38	[2]
Flour millers	Year 1939	19.00	13.17
Wholesale bakeries	September 1941	26.86	[3]
Wholesale bakeries	September 1942	22.41	[3]
Coffee processors	Year 1939	23.05	20.66
Ice cream manufacturers	Year 1940	24.23	[2]
Biscuit and cracker manufacturers	Year 1939	34.66	29.72
Package cereal manufacturers	Year 1939	34.93	30.85
Wholesalers:			
Cooperative wholesale grocers	Year 1939	5.87	.....
Old-line wholesale grocers	Year 1939	9.65	.....
Retailers:			
Retail consumer cooperative grocers	Year 1939	19.50	.....
Retail grocery chains	Year 1939	20.62	.....
Independent retail grocers	Year 1939	22.58	.....
Dairies—retail fluid milk and cream	Year 1940	22.08	.....
House-to-house bakeries	September 1941	37.51	.....
House-to-house bakeries	September 1942	35.66	.....

[1] Outward transportation reported as paid by manufacturer deducted rom both sales and distribution xpenses.
[2] Outward transportation not available.
[3] Outward transportation not separable from delivery expenses of own trucks.

expenses incurred in the distribution of their products. In the case of items such as farinas, rolled oats, corn flakes, packaged flour, crackers and cookies, the high distribution expenses often reflect efforts of different manufacturers to feature their particular brands of the same or similar cereal products all the way to the consumer by expensive selling, advertising, sampling and other means of dealer and consumer sales promotional effort.

In the case of wholesale bakeries, high cost per dollar of sales consists largely of wholesale delivery expense by truck-salesmen. Competition for volume to be supplied from each bakery plant lead to so-called "consignment selling" (prohibited by Food Order No. 1) with its excessive waste and financial loss from stales, long delivery routes which are unprofitable because of small volume of sales, and excessive numbers of calls, especially on city routes to give frequent competitive service to hotels, restaurants and household consumers. Reduction in excessive truck deliveries, due largely to orders of the Office of Defense Transportation, is reflected in the reduction in average total distribution expense shown in the tabulation for wholesale bakers from 26.86 cents per dollar of sales in September, 1941, to 22.41 cents in September, 1942.

Similarly, reduction in mileage traveled and service given by house-to-house bakers is reflected in the reduction of their average cost of distributing bakery products at retail from 37.51 cents per dollar of sales in September, 1941, to 35.66 cents per dollar of sales in September, 1942.

For the sample of independent wholesale grocers covered, cooperative wholesalers operated in 1939 at an average total expense of 5.87 cents per dollar of sales as compared with 9.65 cents for the conventional type of "old-line" wholesalers. The principal items of saving by cooperative wholesalers were in salesmen's and other salaries and wages (3.37 cents for cooperatives as compared with 6.07 cents for old-line wholesalers) and in "other distribution expense"—2.20 cents for cooperatives against 3.32 cents per dollar for old-line wholesalers.

In the retail trade also, cooperative retail grocers showed the lowest total distribution expense of 19.50 cents per dollar of sales compared with 20.62 cents for chain stores and 22.58 cents for independent retail stores. Here the cooperatives were able to show savings in distribution expenses amounting to 3.08 cents per dollar of sales over independent grocers and 1.12 cents per dollar over chain stores.

The highest retail distribution expenses per dollar of sales were shown by retail dairies and bakeries delivering house-to-house. Such delivery, however, includes both wholesale and retail functions. Both milk and bakery products are perishable items, and expensive truck delivery has been employed in distribution to the consumer's door. In the case of bakery products, daily house-to-house salesmanship lengthens both salesmen's and truck operating time and adds greatly to the distribution expense. Prior to the ODT order in July, 1942, second, third or even fourth deliveries of bread in a single day were not uncommon. As already noted, reduction in truck mileage, often by abandoning long or otherwise unprofitable routes, made in compliance with the ODT order was an important factor in reducing wholesale and house-to-house bakery distribution costs in September, 1942, compared with September, 1941, notwithstanding increases in labor and other costs involved in distribution.

The lower distribution expenses for retail chain and cooperative grocers, as compared with those for independent grocers, were incurred despite the fact that certain expenses in the buying and handling of many commodities were greater for chains and cooperatives because of the wholesale function which the latter performed. For example, many commodities which are delivered by the wholesaler to the independent retail stores are delivered by the chain or cooperative from its own warehouse or that of the manufacturer to its individual stores. However, its saving in expenses, principally through the elimination of delivery and credit and through the use of self-service in the store, outweighed the additional expenses incurred by the exercise of the wholesaling function.

Distribution Methods and Spreads for Fresh Fruits and Vegetables

It has long been recognized that transportation and other distribution charges represent a large part of the price paid by consumers for fresh fruits and vegetables. Investigations have established the fact in some large wholesale terminal markets, distribution charges assessed against the selling prices of produce are determined by agreements among cooperating terminal receivers, commission merchants and handlers who control limited rail, water and truck receiving and marketing facilities through which large volumes of produce must be wholesaled. Monopoly charges so fixed generally are on a quantity basis and bear no relationship to the selling prices of commodities affected. The effectiveness of the enforcement of these schemes generally depends upon the extent to which receivers and handlers and unions of their employees cooperate to protect and perpetuate their monopoly position and charges. Entry of non-members into such markets is prevented by rules which, from time to time, are enforced by threats, sabotage and even violence. In order to maintain prices, in some markets, produce may even be destroyed.

The transportation of fresh fruits and vegetables from points of origin, sometimes as much as 3,000 miles away, to large terminal markets is quite expensive. Assembling the production, often of numerous small producers, to make

(Turn to page 129)

British Biscuit Bakers Show How To Meet Wartime Crises

By AN EXECUTIVE OF THE BRITISH BISCUIT INDUSTRY.

Industry cuts production, gives up manpower and space, saves materials, pools deliveries, zones distribution, does without equipment, yet maintains position for peacetime

OF all the food manufacturing industries in Britain the biscuit bakers perhaps have had the most difficult job of all. There are several fundamental reasons for this. In the first place, the biscuit industry is highly specialized. And if it is to be kept running adequately and efficiently for after the war, it must be assured a certain amount of continuity, notwithstanding the present demands for manpower and material. Secondly, the plants are situated mainly in a few centers.

Add to this the problems of the switch-over to production of biscuits for the armed forces, the voracious appetite of the service canteens for a handy form of "eats," the demands of Britain's Ministry of Food for its own particular supplies, and a fast-growing consumption of biscuits among the civilian population before the war.

Taking the long view, there are the probable calls upon the biscuit maker to play his part in the great task of quick and ready feeding of a food-disorganized world after the war. These are some of the reasons for the need to maintain the fabric of the industry as unimpaired as possible.

Yet the industry has been able to steer a fairly safe course among these many shoals. It has yielded up much in the form of manpower, contributed much to a saving of materials, and at the same time has maintained materially the essential fabric of the industry.

Before the war, biscuit manufacture in Britain could be roughly divided into four classifications:

1. Manufacturers whose prewar distribution was of a national character, whose names were household words.
2. Manufacturers having a seminational distribution, whose distribution was mainly confined to large retail distributors; e.g., large multiple stores.
3. Manufacturers of specialty goods which, although small in tonnage, did in some instances have a world-wide reputation.
4. Bakers who were biscuit manufacturers, whose distribution was of a local character.

British Combine

Biscuits being conveyed from oven to packaging department on wire-mesh conveyor in a factory in England. This type of biscuit has been produced in large quantities for the armed forces.

All of these manufacturers are, under wartime conditions, licensed by Britain's Ministry of Food. Those whose production is 12 tons and upwards per annum, hold "A" licenses. All "A" license holders are members of the Wartime Alliance, so the trade's wartime body is representative of almost 100 percent of the biscuit making industry.

The Cake and Biscuit Manufacturers' Wartime Alliance, Ltd. (known in its early days as the Cake and Biscuit Wholesale Manufacturers' Defense Committee) was established at the request of the government in the fall of 1938. The main objects of the establishment of the organization were:

1. That the government might have the large cake and biscuit manufacturers organized in one body, through which it could exercise its measure of control.
2. That the organization should undertake the responsibility of the allocation to its individual members of such total quantities of raw materials as the Minister of Food should, at his discretion, allow.

During the early part of 1939, biscuit manufacturers cooperated with the government in the preparation of supplies of biscuits for women and children evacuated from the cities to country places on an outbreak of war. In carrying out these plans, biscuit manufacturers collectively made and held in stock many thousands of tons of biscuits. These biscuits were regularly "turned over" in the course of the manufacturer's normal trading; thus stocks intended for evacuation purposes were always in fresh condition.

When the time came, these stocks were dispersed at a few hours' notice to hundreds of centers in country places throughout Britain, and in conjunction with other foods, were used for the feeding of the evacuated population during the initial hours of the evacuation and until such times as the local authorities could establish regular feeding arrangements. Parliament voiced its thanks to biscuit manufacturers for the part they played in this important work.

Restrictions Introduced

Prior to the outbreak of war, the Alliance had established the usage of raw materials for each member. One month after the outbreak of war, it commenced its responsible task of allocations. From that time, this work has gone on, and a variety of ingredients, numbering over 50 and totaling hundreds of thousands of tons per annum, are distributed regularly. The number of permits issued by the Alliance during the year ending June 30, 1942, was 23,500. This number was greatly increased during the year 1942-3.

Late in 1940, when gasoline became

more scarce, the ministries of food and transport suggested to the Alliance that joint deliveries of biscuits should be introduced. A detailed plan for pooling deliveries was formulated, and in March, 1941, experimental operation was begun.

Pooling was undoubtedly a real adventure, and the difficulties encountered were manifold. After the experimental work in ten sparsely populated counties, an organization was built up which found it necessary to open 130 delivery depots, providing a maximum radial delivery of approximately 25 miles and practically halving the aggregate mileage formerly operated by individual members.

The primary object of pooling was economy in gasoline and trucks. It was inevitable that the joint deliveries should produce a financial saving. By the end of 1941, the pool's financial commitments had reached considerable proportions, and its cash turnover was at the rate of hundreds of thousands of pounds per annum.

The pool was incorporated into a nonprofit limited liability company, with a management committee appointed by the Alliance to formulate policy, and a controller to direct administration. The Biscuit Delivery Pool, Ltd., can be claimed to be a successful demonstration of what can be achieved in an industry, given the wholehearted cooperation of its members. The economies affected by the Pool in its first year of operation are noteworthy—over half a million gallons of gasoline and six million truck miles, with the resultant saving in tires, spare parts, and so forth.

In early 1942, the Ministry of Food issued a statutory rule and order controlling the price of biscuits to the public. The Alliance cooperated with the Ministry of Food in the production of this order. Simultaneously with the order, the Alliance produced regulations fixing the maximum prices at which manufacturers could sell their biscuits and governing manufacturers' prices to the retail distributive trade.

The Zoning Plan

Between 1941 and 1942, the Ministry of War Transport insisted that there should be economies in the haulage of the industry, and under the aegis of the Ministry of Food, a system of zoning was introduced to save manpower, road vehicles, gasoline, rolling stock and so on. The main difficulties were that biscuit production was centered chiefly in only three areas of Britain. There were many areas where large quantities of biscuits were required but the production was relatively low. Consumption also varied in relation to the population, being inordinately high in Northern Scotland.

The first essential of the zoning plan was to ensure equitable distribution throughout the whole population, with the elimination of all unnecessary haulage and a reduction in the return haulage of empty tins. A per capita ration for Britain was calculated by dividing the total tonnage of biscuits available by the total population. All manufacturers were zoned, and a scheme was prepared to draw the required tonnage of biscuits of reasonable selection into each divisional food area.

A zone was arranged for each plant, having regard to the previous distribution of that plant's products and the geographical situation of the biscuit plants in relation to demand, but always in relation to the plan as a whole. Equality of treatment was achieved as far as possible by allotting to each national distributor such areas as would give him a population to serve of approximately 20 million.

This was designed to equalize the position as between the single-plant firm and the multiple-plant firm; plants with a seminational distribution had, necessarily, a smaller population allotted to them. The zoning plan was applied only to some 64 firms which had a substantial distribution of their products beyond the limits of the divisional food area in which their plant was situated. The remaining local distributors merely were instructed to confine their deliveries to their existing zone of distribution.

In order that the multiple-plant firms should not have an advantage over the single-plant firms, these firms had to be zoned much more tightly around their plants, so that the total population served should not exceed that served by the single-plant firms.

The uneven geographical distribution of the plants inevitably produced some apparent anomolies of zoning, some biscuits traveling quite a long distance from their production point. But every endeavor was made to keep these anomolies at a minimum, and in this task, of course, the manufacturers played a big part.

A scheme of common use of tins came into operation, and this aided considerably the common aim. The result of the first year of operation of zoning was the saving of at least sixteen million ton miles of transport. The scheme is not static; effort is constantly being made to increase these savings, and a complete revision of the plan which, it is hoped, will result in a still further tightening of the zones, has just been put into operation.

It is much too early to appreciate and assess the effects of the new scheme. But it is thought the results of the earlier and later schemes together will be to reduce to less than one-quarter of its former total the ton-mileage required to transport the industry's products.

Gave Up Labor and Space

In the execution of its wartime program, Britain's government made two great demands upon all industries not directly engaged in war production, the first for labor, and the second for space. The biscuit industry offered immediate cooperation, with a view to releasing the maximum amount of both space and labor.

The industry voluntarily offered a total of not less than one million square feet of space. It then established regulations governing production and lessening productive labor. No firm was permitted to make more than 20 kinds of biscuits. The severity of this regulation will be appreciated when it is stated that in peacetime some firms made as many as 500 different kinds of biscuits.

The packing of assortments was prohibited, likewise any form of double processing. Export was stopped, and no firm was permitted to employ more than three operatives per ton of production per week. The effect of these self-imposed restrictions, together with the drafting of large numbers of operatives (both male and female) under the Military Service Acts, was to reduce operative personnel in the industry to about 25 percent of its peacetime standard.

In the middle of 1942, however, the demand for labor made it necessary for the government to call upon the biscuit trade for a further concentration scheme, and to require a reduction in the total production to approximately half of the level at which it then stood. Despite the severity of these measures, the industry was able to formulate plans for dealing with them, and the resultant release of labor and the corresponding saving of raw materials are now taking place.

The plans were founded on the principle that the release of labor should be spread as evenly as possible over the industry so as to avoid the entire closing of any plant. In recognition, however, of the fact that in certain areas the demands for labor were much more acute than in others, agreement was reached for the release of proportionately more labor in the plants located in areas where labor was easy.

The plants where higher than average release of labor was to take place were known as the "affected" plants. The total tonnage available to the industry under the new conditions was then divided among all the plants in proportion to their output in the six months ending June 30, 1942. Where an "affected" plant, because of labor withdrawals, was not able to produce the whole of the

quota allotted to it, arrangements were made for the balance of production to be carried out in an "unaffected" plant under a mutual-help scheme.

This ensured that the "affected" plant received the profit of such goods as were made on its behalf, while the helping firm received no financial benefit whatever.

It was agreed that after the operative labor basis for a plant had been fixed between the Ministry of Food and the Alliance, the plant was to be notified as to the number of employees it was expected to release, and it would release them as and when required. Each firm was required to conform to a maximum operative manpower unit of three tons per week, and to release any labor in excess of that figure.

Similar arrangements were made to satisfy the Board of Trade demands for space in biscuit plants.

The general effect of this concentration was to reduce the total production of the industry to a "target," or ceiling, of 200,000 tons per annum, this total figure to include government and other priority requirements. The amount to be devoted to civilian consumption was calculated to be only about 25 percent of the peacetime consumption, so the extent of the sacrifices of the industry readily can be calculated.

The Cake and Biscuit War Time Alliance has served the government in many other directions, quite apart from those major problems of manpower and transport economy. Some time ago, a technical committee was set up to give the industry advice on efficiency in the use of fuel, and the findings of that committee have been of value not only to the biscuit industry itself but to other branches of food manufacture.

In the early days of the war, enemy action had its effect upon plants, and arrangements were made by which unharmed plants took up the burden of those suffering from enemy action, with the consequence that production was maintained.

Tells People About It

On the principle that the British, or any other public, will undergo much in the way of deprivation of peacetime indulgences and little luxuries if they are only told why it is necessary—a policy that has been rigorously pursued by the Ministry of Food in all its undertakings—the Cake and Biscuit Alliance has devoted particular attention to this aspect of its work. For some time now it has operated an efficient public relations office, manned by expert publicists.

A well-known publicity agent was employed, and the result of his work constantly can be seen by reference to the operations of the Alliance, in both the editorial and the advertising columns of Britain's daily press. The Alliance's case is being regularly and systematically advertised in all the leading newspapers of Britain, and this has, undoubtedly, gone a long way toward making the manufacturers' side of the story understood and appreciated by the too often neglected average citizen.

British Combine

Eleven rows of round biscuits being conveyed into packaging department of British biscuit plant, where girls put the product into metal containers for the armed services. The biscuits move along on a wire-mesh belt and vertical dividers keep them in rows for quick handling.

The organization of the industry is claimed to be simple in its efficiency. The council of the Alliance is composed of members nominated by peacetime trade bodies, all of whom are welded together in the Alliance. Much of the work is done through committees specifically set up for a given purpose. Some of these committees have executive powers, but all committees report to the council, and the council accepts responsibility for all work.

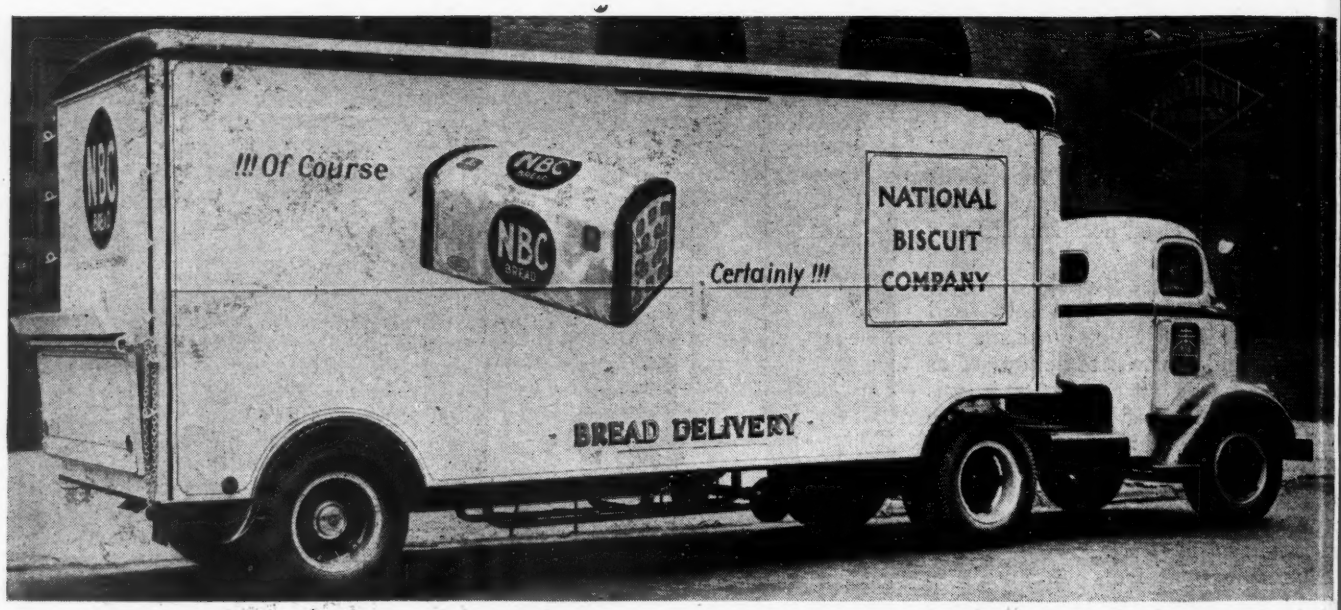
The secretariat is, principally by reason of its allocations work, now a considerable force, numbering forty-eight. The entire finance is subscribed by the industry on the basis of the tonnage of ingredients used during the basic year.

How will the cake and biscuit industry of Britain emerge from its war-time stresses? First of all, as to the maintenance of the manufacturing fabric of the industry, it is encouraging to note that both the Ministry of Food and the War Time Alliance have kept in constant view the part that the industry must inevitably play in the postwar effort and the restoration of the exports.

From the point of view of the civilian market, restricted consumption has been enforced by placing biscuits under a point rationing system. As has been previously pointed out, the wartime makes of biscuits have been severely standardized, until they can now be placed in three general categories—unsweetened, sweetened and chocolate covered.

The points for the biscuits have been increased and decreased from time to time according to the supply position. Recently there has been a fairly steep rise, mainly due to the demands of the armed forces. Consequently, the British public is being severely rationed. What supplies are available in the stores naturally lack the quality and attraction of their predecessors. In fact, the biscuits of wartime can be said to have assumed "battle dress." Just what effect these considerable restrictions of quality and quantity will have on the postwar home market is the subject of much interesting speculation.

Shrewd judges say that this drastic wartime treatment will have the effect of a remarkable resurgence of the home trade after the war, and that, with the hundreds of attractive varieties again open to them, the British public will indulge their fancies in this direction as they have never done before.



Large-capacity tractor trailer units, such as the Freuhauf shown above, are employed to transfer loads of from 8,000 to 13,000 loaves of bread from efficient large-volume bakeries to surrounding substations from which smaller trucks deliver to retail stores on relatively short routes. The vehicle shown here operates from one of National Biscuit Co.'s bakeries in Newark, N. J., to several small outlying distribution points. Small delivery units pick-up the products at these points.

Wartime Restrictions Cut Delivery Costs

Reports from 1,000 bakers show that elimination of long routes is greatest factor in reducing mileage by 32 percent. Gross sales remain same and overall cost is less. Savings may be maintained after war

ACCORDING to 1,000 replies to a questionnaire sent to the nation's bakers by the National Association of Bakery Sales Managers, with headquarter in Milwaukee, Wis., there is one benefit generally derived by bakeries because of ODT restrictions on truck mileage to conserve tires. That benefit is the highlighting of the disproportionately high cost of long-distance bakery routes.

The questionnaire answers indicate clearly that delivery costs have been high, due mainly to operating at too great a distance from the plant. And the prediction is that it will be a long time after ODT restrictions are lifted before bakers will again operate such long-distance routes. This is not surprising. In fact it is to be expected from any analyses of bakery delivery costs.

Long Hauls Unprofitable

For years, not only bakers but other food field distributors, including dairies, wholesale grocers and other organizations selling food products, have known that long-distance delivery routes were not profitable. They have known that the spread between cost price and selling price has not been sufficient enough to cover the increased delivery costs of extremely long routes. Yet the ability of the motor vehicles to cover the routes, with or without extra labor costs for the driver salesmen, and the persistent desire of the average sales or plant manager to increase the volume of sales, have resulted in these long routes becoming an integral part of many delivery areas.

In many cases the proportion of long routes has become too great, and it has taken corrective measures from without, such as the ODT mileage restrictions, to correct the situation. To this extent, ODT restrictive orders have benefited bakers, to say nothing of the conservation of tires which all fleet owners sincerely hope will tide them over until synthetic tires of adequate mileage capacity can be produced in sufficient volume to avoid wood tires or other substitutes. Synthetic tires will not be available in quantity for several months.

Substation Distribution

For many years prior to the promulgation of the ODT orders to reduce total delivery mileage by 25 percent, beginning in June, 1941, many of the large bakers realized the unprofitableness of long routes and set up the substation system of distribution. In this system, the bread is baked in an efficient, large-volume bakery and transferred in large-capacity motor tractors and trailers to the substation. From there it is delivered in smaller trucks within the prescribed sales area.

With satellite substations surrounding a main bakery plant, the final delivery routes are much shorter than routes covered from the main plant. One of the tractor-trailer units used in a main plant to substation transfer is shown in the accompanying illustration.

2,200 Bakers Receive Blanks

The questionnaires, the answers to which showed the high cost of the long-distance routes, were sent to 2,200 bakers throughout the nation. Of the 1,500 replies, 1,000 complete answers were selected to help determine the effects ODT orders have had on delivery costs, gross sales and state returns in the bakery industry.

Of the 1,000 replies analyzed, 100 were from house-to-house operators and 900 were from bakeries making wholesale or store deliveries. The replies were received prior to the issuance of Food Distribution Order No. 1, which has resulted in some changes but not enough to radically modify the conclusions drawn.

Mileage Cut 32 Percent

The average mileage reduction of the 1,000 bakers reporting was 32 percent, or well over the 25 percent required by ODT. Some bakers reported reductions as low as 12 percent and others as high as 45 percent.

Elimination of the long-distance routes was the greatest single factor in reducing the total mileage run. Cutting out "dead-bread" stops was second, and taking off routes was third. Going from a six- to a five-day week, working suburban routes every other day instead of daily, and trading accounts also proved helpful in reducing long routes.

Conversion to exclusive daylight delivery was the most important factor in complying with ODT orders of no special deliveries and no call-backs. However, dropping stops and shipping by contract motor carriers or other means were also contributing factors.

Gross Sales Not Affected

Six hundred of the 1,000 bakers, or 60 percent, reported that the combination of reduced mileage, no special deliveries and no call-backs had no noticeable effect on gross sales. While nearly one-third reported an increase in gross sales of from 5 to 30 percent, and one-tenth reported a decrease of from 5 to 32 percent, it was apparent that both increases and decreases were caused by other factors.

The reports also showed that either increases or decreases affected all production quite generally. During the period covered, however, there was a natural increase in demand, with the swing favoring sweet goods.

The most gratifying effect of ODT orders and the promise which they hold for continued economies in days after the war, if the policies which these orders cover are continued, is that with no decrease in the gross sales of 600 of the bakers reporting, the overall delivery expense reported by 850 of the bakers was decreased from 2 to 20 percent. Fifty of the bakers indicated an overall delivery cost increase of from 1 to 10 percent, and 100 reported no change.

Other details disclosed by the questionnaire replies showed that the majority of alternate-day deliveries were made by doubling up the routes and running them every other day rather than by eliminating every other driver salesman or alternating each salesman's working day.

Similarly, the replies showed that for 685 out of the 1,000 bakers who answered, the change from six- to five-day-a-week deliveries did not lead to a reduction in gross sales. Also, alternate-day deliveries did not reduce gross sales.

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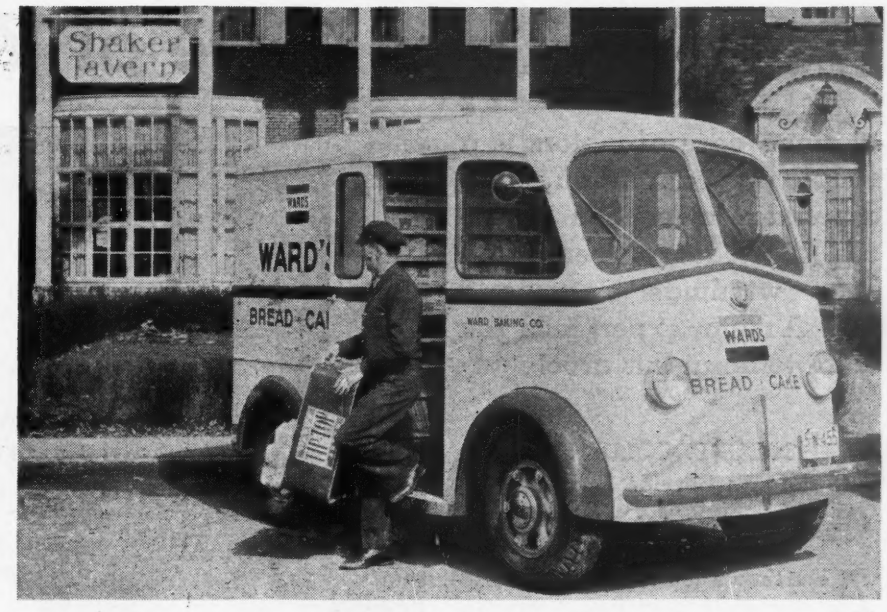
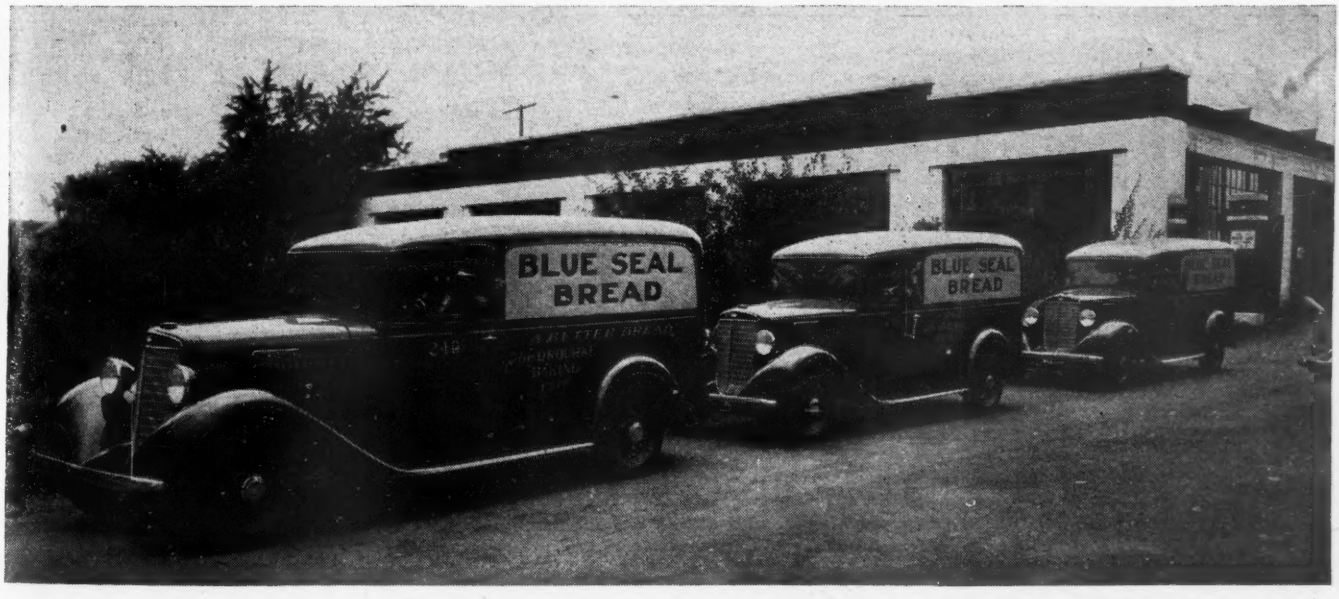
*The findings on distribution costs reported in this article are in line with distribution cost data compiled by the Federal Trade Commission and reported in the article, "What It Costs to Distribute Important Food Products," page 58.—*THE EDITORS.



Here is a White Horse, one of the most modern designs of house-to-house and store-to-store trucks. The route mileages of this type of delivery unit have been reduced in accordance with ODT orders to conserve tires. The White Horse truck features an air-cooled rear engine drive and a welded all-steel body.



Bread route trucks such as these are used in thousands of the nation's smaller cities and towns. Operated by O'Rourke Baking Co., Buffalo, N. Y., the small trucks are capable of covering long-distance routes, many of which have been discontinued to comply with ODT directives to reduce the total mileage run. The trucks are ½-ton panel-body Internationals working from the plant shown in the background. The panels on the bodies are used effectively to advertise the product.

How To Take Care of Your Motors

Planned care of motors is a simple procedure. You set up a regular inspection schedule, lubricate properly and keep windings clean and dry. A motor expert tells you what to do in this article

By THOMAS L. GOLDEN
Philadelphia Service Shop, General Electric Co.

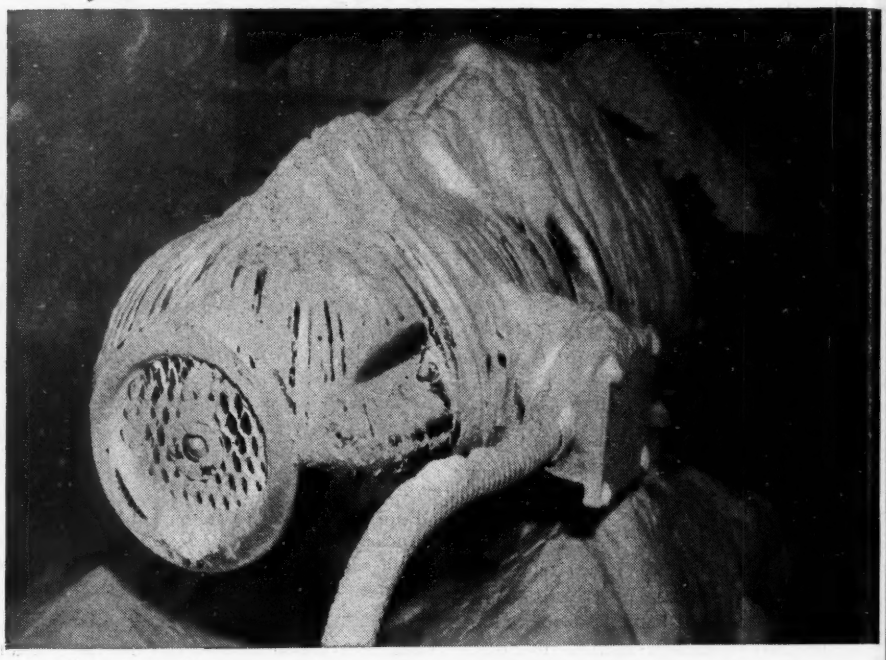


FIG. 2. Although this motor was operating satisfactorily, dirt should not have been permitted to accumulate in such quantities, as overheating might result.

AT a time when it is difficult to replace electric motors, *systematic* care and inspection of this equipment is essential to maintain production in the food plant. Systematized maintenance offers very real advantages in extending the useful life of the motor and preventing costly and embarrassing interruptions of service.

Generally speaking, planned motor care is a simple matter. Here are a few fundamental steps, which, if conscientiously followed, will more than repay you for the effort they require.

How To Get Started

The first consideration in establishing a regular inspection schedule is to obtain complete information on the motors under your control. This can be done by filling out a record card for each motor in the plant. Figure 1 shows a typical record card available on request. If you do not have all of the information needed to fill out the card, the motor manufacturer will be glad to supply it.

These cards will show what renewal parts should be carried on hand to guard against a failure of bearings, brushes or other replacement parts. They will expose excessive amounts of attention or expense, and the causes therefor can be determined and corrected. They may reveal how an important motor which has failed can be replaced by one of similar characteristics from an operation which is not so essential.

The card record constitutes a definitely progressive step in motor maintenance.

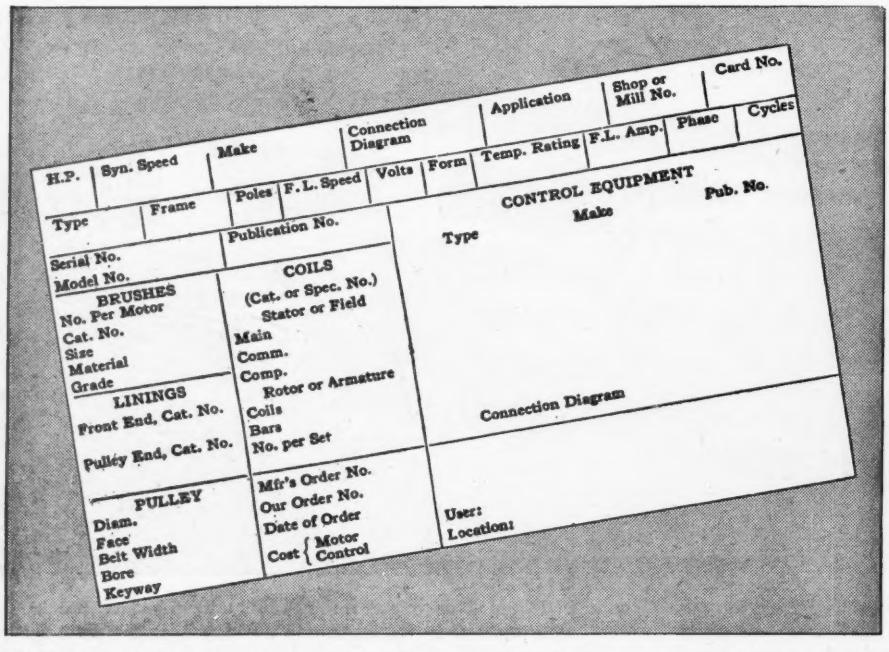


FIG. 1. Typical record card which should be kept for every motor in the plant. On reverse side are columns for keeping service and repair records.

Frequency of Inspection

You can't make too many hard and fast rules about motor maintenance. Frequency of inspection, for example, will depend upon the importance of the particular motor and the severity of operating conditions. Motors which are installed where dust, dirt, moisture or other harmful conditions are present to an appreciable degree require more frequent attention than those which operate under more ideal conditions. An inspection schedule must, therefore, be elastic and adapted to the needs of your own plant. But once a routine has been determined, it should be followed regularly and persistently.

Bearing Lubrication

Of primary importance in the maintenance scheme is the attention given to bearing lubrication. Here are a few points which should be included in the regular schedule:

Check once every week to see that oil is at the right level and that oil rings turn free with the shaft. At the same time make sure there is no leaking of oil or grease along the shaft. It is a good policy to drain the oil well every

ix months, wash the bearing with kero-ene, and put in new oil. Beware of too requent oiling of bearings. Excess lubri-ant is often carried into the motor windings where it collects harmful dusts nd causes rapid deterioration of the nsulation.

The subject of ball-bearing lubrica-ion is one not generally understood. Some maintenance men are not aware hat their liberal use of the grease gun nay be doing more harm than good. The bearing housing which is more than hree-quarters full of grease will heat ex-essively due to the working or churn-ng of the lubricant. This not only re-luces the useful life of the grease but nay lead to serious bearing failure. In ddition, excess grease has the same armful effect on motor windings that il has.

Cleanliness is a rule to be observed n the care of ball bearings. Dirt and rit will hinder the smooth running of he bearing and may even cause locking f the balls in the separators, with sub-equent failure.

Many ball-bearing motors have the ressure-relief system of lubrication, which prevents overgreasing the bear-ng. Motors lubricated by this method ave a pressure gun fitting over the bear-ng and a relief plug beneath the bear-ng. When lubricating, unscrew the plug rom the bottom of the housing and emove any hardened grease with a crewdriver or pointed tool. *While the motor is running*, add grease with a and-operated pressure gun until the old rease begins to flow from the relief ole. Allow the motor to run long enough after adding grease to permit the rotating parts of the bearing to expel all excess grease.

Reputable oil or lubricant companies should be consulted regarding the grade of grease or oil for the particular operating condition.

Cleaning the Motor

The extent to which dust, moisture, oil or other harmful substances may enter the motor will actually determine the cleaning period. Most motors will need a thorough cleaning once a year.

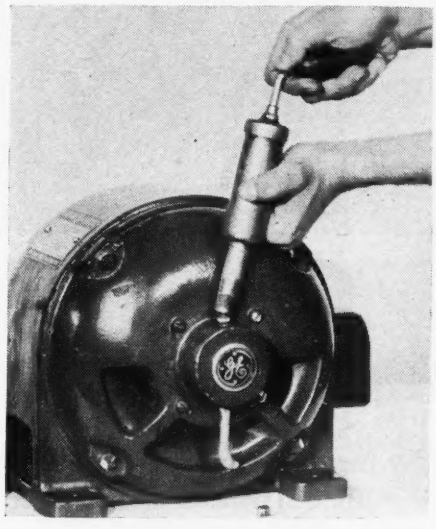


FIG. 3. For maintenance convenience, many motors have ball bearings arranged to be greased with a pressure gun. Here is a standard ball-bearing open motor being greased after hardened grease has been removed.

Dry dust and dirt may be blown out of the motor by using compressed air of moderate pressure. Remember that the important thing is to get the dirt OUT of the motor, and the air stream should be so directed that the dirt will not be driven into the slots or pocketed between the coil ends. If the compressed air contains moisture, or if the dirt is abrasive, a suction system will be more satisfactory.

When heavy dirt or grease is present, the excess can be removed by a fiber scraper or a stiff brush. The balance can be washed off with carbon tetrachloride, or one of the safety cleaners marketed by oil refiners. Gasoline or naptha can be used but these set up such a fire hazard that their use is not generally recommended.

Do not be too generous with the cleaner. If the winding is soaked with the fluid it may damage the insulation. The best method is to use a cloth saturated with the liquid and wipe down the coils. A brush dipped into the cleaner may be used in the coils ends and corners.

The place selected for the cleaning should be well ventilated. Even though the cleaning fluid may not be a fire hazard, it may have a toxic effect on the workman if the fumes are not carried off.

After the insulation has thoroughly dried, it should be sprayed or brushed with a good quality air-drying varnish. Be sure to clean off all varnish from the laminations in the stator bore, otherwise this varnish may cause the rotor to

(*Turn to page* 118)

FIG. 4. A megohmmeter is very useful in maintaining motors.

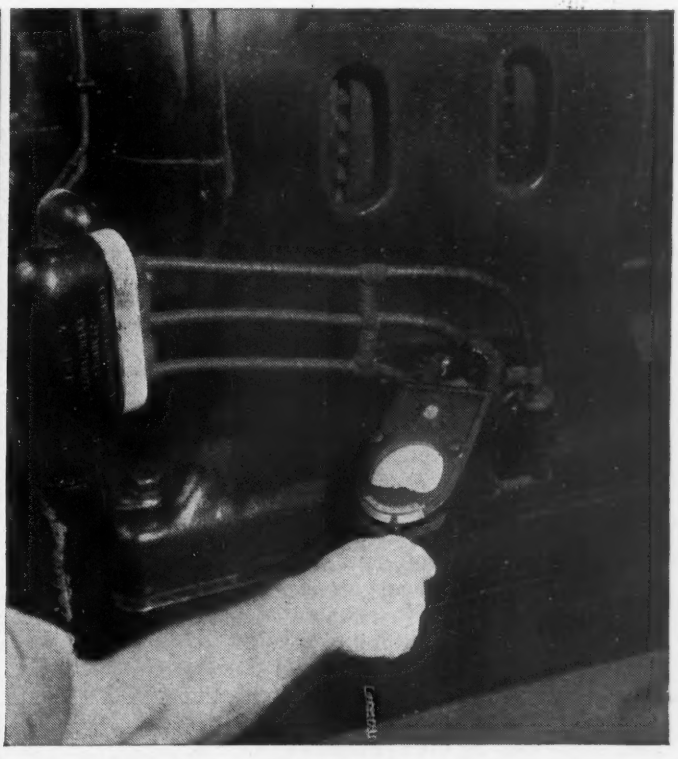
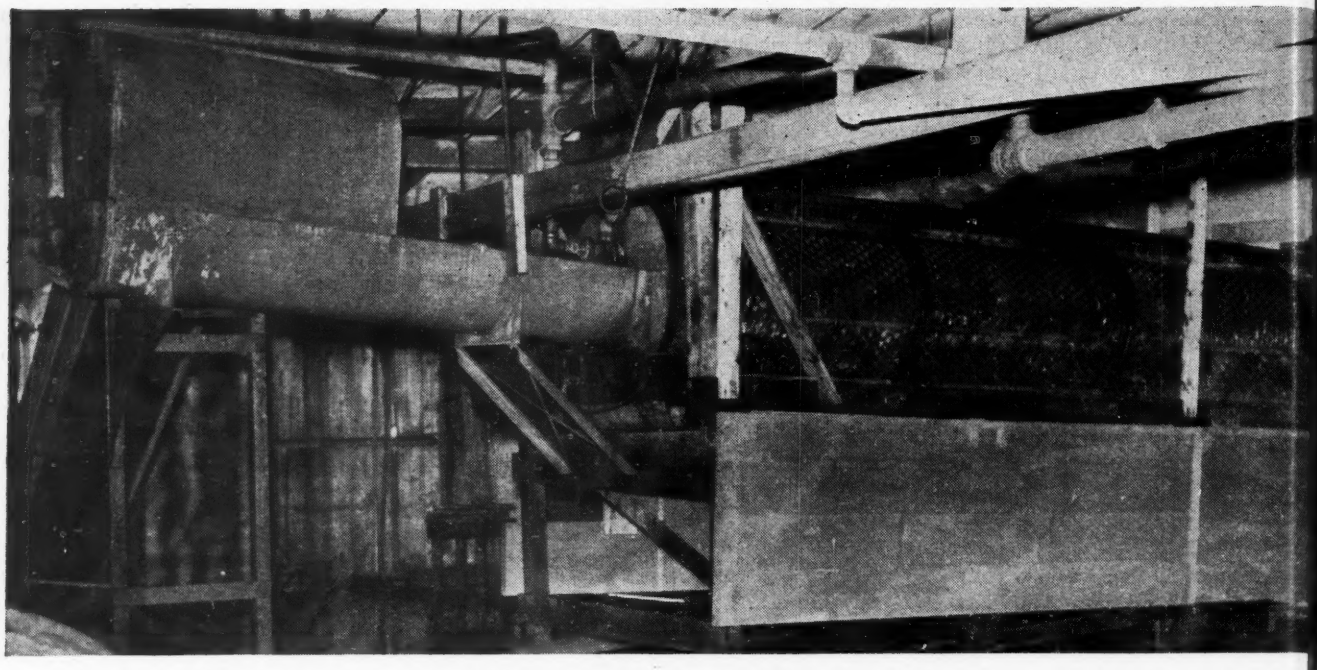


FIG. 5. Hook-on volt-ammeter being used to measure current.



View of Vucassovich automatic scaler showing feed end and the elevator (left) which conveys the fish to the scaler.

Scaler Boosts Fish Production

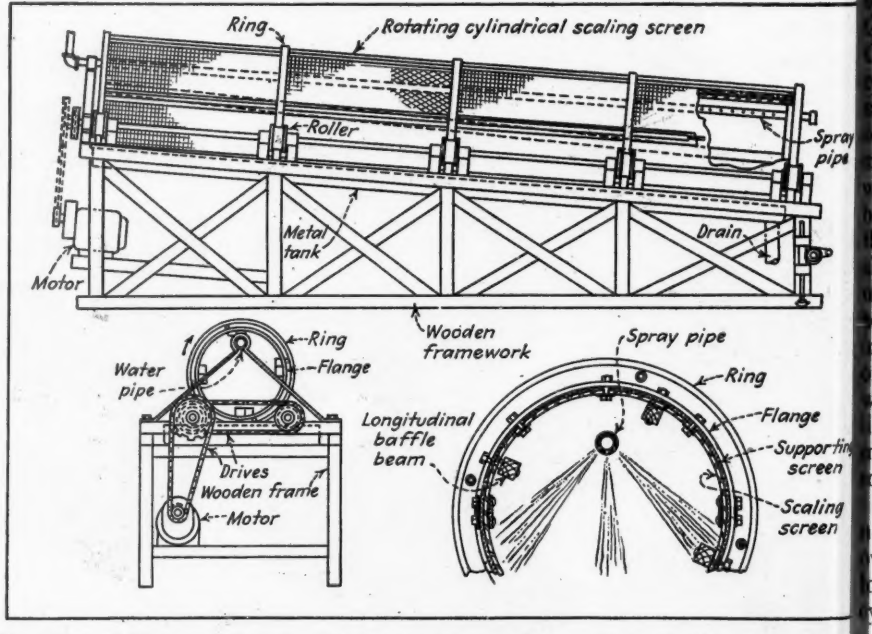
With it, Gorton-Pew turns out more fillets with fewer workers. A simple machine, it pulls out scales as fish are tumbled through it

By L. V. BURTON,
Editor of "Food Industries."

AN important contribution to the nation's food supply is found in the automatic fish scaling machine invented by Michel P. Vucassovich, food technologist of Gorton-Pew Fisheries Co., Ltd., which was granted a U.S. patent, No. 2,331,855, on October 12, 1943. This invention has made possible the production of larger quantities of commercial fish fillets by the reduced force of employees that wartime conditions have imposed on Gorton-Pew, as they have on other employers in the food processing industry.

The machine apparently is simplicity itself. A conveyor carries the fish from the fishing vessel to an inclined revolving cylinder from which they emerge at the lower end minus all scales. To a casual visitor, the Vucassovich scaling machine looks very much like a rotary washer used for tomato, pea, or lima bean washing in canneries or like the rotary washers used for cleaning root crops in vegetable dehydrating plants. But none of those machines would do what the scaling machine will do by reason of its internal construction. In fact, it is one of those machines the function of which it would be difficult to discover from its appearance. Yet fish can be scaled by it at the rate of 15,000 lb. per hour, whereas the best previously known method of electric scaling would require about 25 active men to keep up this pace.

To appreciate what the device can do to augment production, it should be compared to the procedure followed prior to its invention. Where hand operations were used, there was a crew of three men, one operating the electric hand scaling machine at a rate that would supply scaled fish to two fillete



Drawings of Vucassovich automatic fish scaling machine. At top is side view showing how revolving unit is mounted. Below at left is end view showing drive and mounting; drawing at right gives details of construction.

his crew could handle about 600 lb. fish per hour. Thus, the cost of the aler man is eliminated and he can be ut at filleting, which pays a slightly igher wage rate and is a much more ttractive and less hazardous job.

The actual saving of 33⅓ percent on an-hours in this day of labor scarcity, ith deductions for the cost of mechanal scaling, actually figures out to be a sh saving of $0.50 per 100 lb. of llets produced. Better yet, labor is eased at the elimination of a messy b, for where hand scaling is emoyed the scales fly in all directions, any one knows who has ever cleaned fish.

Another way of looking at it is that er 100 men in Gloucester alone are ved for other jobs. Were it not for is scaler, the Gloucester redfish proction would be lower and the balnce left for civilians would be conderably less. The Army is taking a igh proportion of the Gloucester proction.

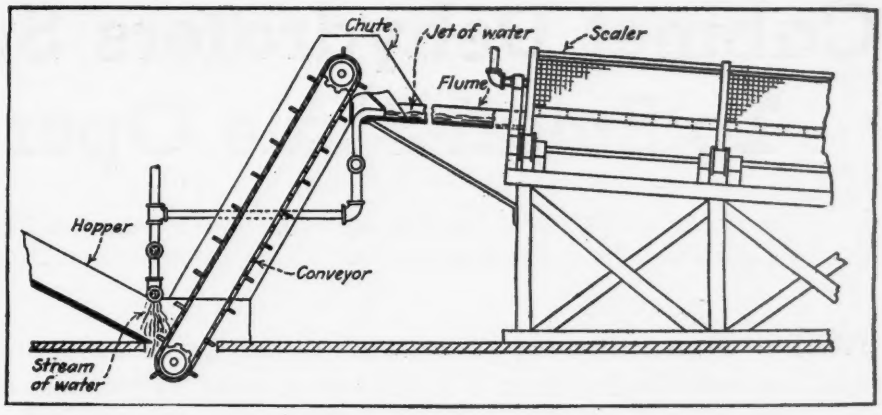
How It Works

All previous methods of scaling involve a principle much like that of emoving old shingles from a roof, except for a few fish that, like herring, an be easily scaled in a revolving cylinder lined with bristle brushes. The Vucassovich method, in contrast, depends on pulling the scales out by the sharp dges of the special liner of the cylinder. Instead of being turned up upon their oint of fastening, they are pulled out irectly.

The idea for the machine arose from wo problems created by wartime scarcty—a shortage of steel rasps for shapng cork insulation for a refrigerated torage room which was under conruction in a Canadian plant owned by Gorton-Pew and the excessive cost of Chinese bristles used in a brush-lined ylinder for scaling whiting, one of the asy-to-scale fish. Expanded metal lath n a block of wood proved to be an xcellent substitute for a rasp with hich to shape the cork blocks, and here the inventor got his original idea hat, if it would scrape off cork it would lso remove fish scales. But it was not ntil the prohibitively high cost of ristles forced him to seek a substitute n the expanded metal lath that the riginal idea was ever given a trial. It orked. First tried on an easy job ke whiting, it was next tried on the ost difficult of all—the redfish or osefish—where it also worked.

Certain added gadgets were also eeded to make the slippery fish turn ver and over, so interior baffles affixed ongitudinally to the interior of the ylinder were added.

The machine, however, rusted out n a week, for the metal lath is the asily corroded carbon steel. The next problem was to get expanded metal lath made from stainless steel. Furthermore, it had to be cut at a time when the stamping dies were dull to obtain rough rather than smooth edges. These rough edges are necessary to pull the fish scales out.



The elevating mechanism which feeds fish to the automatic scaler is diagrammed here.

Fish filleting line in Gorton-Pew plant. Before the automatic scaler was developed, it took one man with an electric scaler to keep two filleters busy.

Closeup of elevator conveying fish to the feed end of the scaler. Water sprays on the fish at the lower end of the elevator.

The weight of a mass of fish in the revolving cylinder presses the fish scales against the sharp edges with sufficient force to pull out the scales when the mass of fish is tumbled about. With a cylinder long enough to insure that all the scales of each fish were brought into contact with the sharp edges of the expanded lath, and with a spray of water inside to wash away the scales, the mass of fish comes out of the scaling machine in perfect condition in a steady stream which goes to the filleters. The flesh of the fish is not seriously abraded.

The machine works best when heavily loaded with fish, because the weight of the load forces the scales against the sharp edges. Also, the machine works better on fish that are difficult to scale by hand than it does on the easy ones. So far it has been used with perfect success on large, medium and small fish of the following varieties: pollock, haddock, rosefish, whiting, flounder and hake. Why not cod? Well, the cod has few scales of importance to be removed. Machines already are in use in several of the fishing ports on the Atlantic Coast; perhaps a use for them will be found in the west.

To exploit this invention the Gloucester Research Corp., a subsidiary of Gorton-Pew Fisheries Co., Ltd., has been formed. The plan is to license others to use the machine at a royalty based on the quantity scaled.

Although all the scaling machines used by Gorton-Pew have carried large signs to inform all persons by the legend "Patent Applied For" of the legal status of any who copied the idea, the Vucassovich scaler has been widely copied. Now that U.S. Letters Patent has been granted, an interesting legal situation arises with respect to all users of copies who, as of the date of issuance of the patent, become infringers. The company hopes to avoid any unpleasant situations by employment of a wise and generous policy of licensing on a modest royalty basis.

Applications for patents have been made in foreign countries.

Cabinet Dehydraters Suited To Small-Scale Operations[1]

By E. A. BEAVENS,* Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

PART I—These units are practicable for experimental work and for dehydrating from 1 to 20 tons of fresh vegetables a day. They also permit handling of different products at the same time. The author discusses the types of cabinets and their operation and uses in a comprehensive manner

CABINET dehydraters are playing an important part during the present emergency dehydration program. They are used for two main purposes—(1) for experimental operations to provide drying rates and other data that may be applied to commercial-scale operations, and (2) in single or multiple units for dehydrating small amounts (from 1 to 20 tons of fresh vegetables per day), particularly where it is desirable to handle different vegetables at the same time. If the size of the operation is to be comparatively small, as in community or institutional dehydration, the cabinet is the practical choice rather than a small tunnel dehydrater. Continuous-type dehydraters should be kept running for long periods of time without shutdowns, whereas cabinet dehydraters can be operated for short or long periods.

[1] Bureau Publication No. O.P. 4061.

* Laboratory of Fruit, and Vegetable Chemistry, 148 South Mission Road, Los Angeles 33, Calif. Further information on designs of dehydraters discussed here can be obtained from this Laboratory or from the Western Regional Research Laboratory, Albany 6, Calif.

Construction

A typical cabinet dehydrater consists of an insulated structure, square or rectangular in shape, equipped with a circulating fan which forces the air through a suitable heating system and distributes it uniformly through one or more stacks of trays filled with the material to be dried. The outer walls and top of the cabinet may be constructed from a number of materials such as plywood, Masonite, tongue-and-groove, plaster, brick or hollow tile, and the inner surface should be made of a fireproof material such as Flexboard or Transite. Precautions should be taken that no inflammable materials are used around the heating chamber, particularly if the heater is an open-flame type. Suitable duct turns, baffles or guide vanes sho be provided to insure uniform distri tion of the heated air through the t to prevent uneven drying. An adj able damper system admits fresh into the cabinet and exhausts the m air. By proper adjustment of these da ers, a definite percentage of the mo hot air can be recirculated to conse fuel, and in addition a control is ma tained over the degree of humidity the cabinet. Wet- and dry-bulb t mometers and a thermostat are mount on the intake or hot side of the c inet for temperature control.

Cabinet dehydraters differ from e other mainly in the manner used to h the air, and the method used to c culate this heated air through the load trays. Cabinets may be heated by t direct combustion of natural gas butane into the circulating air fl since the products of combustion, s as small amounts of carbon dioxi carbon monoxide and sulphur dioxi are not harmful to the dehydrated pr ucts. However, manufactured illumin ing gas is not recommended for dir combustion because of contaminat by injurious byproducts. Under c fully controlled conditions, some of t higher grades of fuel oil may be burn in the heating chamber. Cabinets m also be heated with fin-type steam c or iron pipe steam radiators, while oth may employ one of several types of h exchangers using gas, coal, coke or wo as fuel.

The final choice of a heater depe to a large degree on the availability the most economical fuel, the cabi design, and the construction materi used. By the use of direct heating, w gas or oil as fuel, most of the heat value of these fuels is utilized, wher in the indirect heat-transfer syste only 50 to 75 percent of the heat value is made available. In any case, t heating system should be of such cap ity that it will supply from 1,200 1,500 B.t.u. per hour per square f of tray surface. This figure is about h the required capacity if absolute ma mum performance is desired to obtai high initial rate of evaporation. Si the heat demand is so much less dur most of the run, it would be uneco nomical to have such a high initial he ing capacity. These figures may be

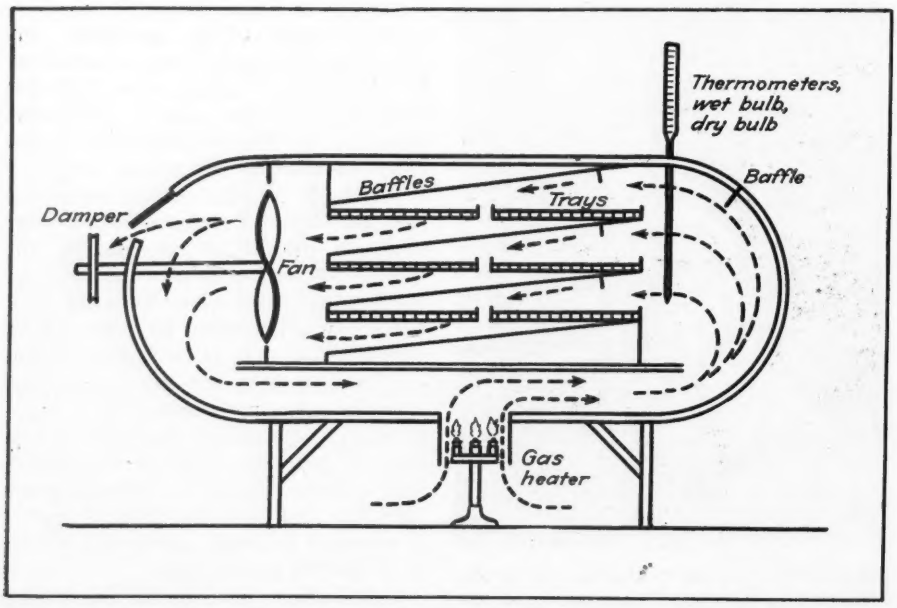


FIG. 1—Through-circulation cabinet dehydrater equipped with baffles between trays.

rded as a reasonable compromise. The pacity of the heating unit will depend n several factors, such as amount of sulation in the cabinet, heat losses, elocity of the air flow, temperature nges desired, percentage of recircula- on of the air flow, and the load to be ried.

Most cabinet dehydraters are equip- ed with centrifugal or rotary fans, of hich there are many types; others em- oy two- or four-blade propeller or dial fans. These fans should be of such ze and should be driven at such speed to deliver an air velocity of approxi- ately 800 to 1,000 ft. per minute as easured between the normally loaded ays.

With most of the larger commercial nnel dehydraters, the normal direc- on of the air flow is across, or parallel , the surface of the layers of prepared aterial, and this arrangement is known "cross circulation." Cabinet-type de- draters can be so constructed that the r flow is forced through the layers of aterial spread on screen-bottomed ays, and this arrangement is known as through circulation." In the former rangement, relatively thin layers of aterial must be used, since the bottom ieces in a deep layer will dry slowly if e air flow is parallel to the surface. the latter, or through-circulation rangement, deeper layers of material n be used because all pieces are in ontact with the air flow.

The prepared vegetables are spread on itable trays made with sides of either ood or metal and bottoms of galvan- ed hardware cloth. All-wood slat- ottom trays must be used for the dry- g of fruits, because galvanized wire- ottoms would be attacked by the fruit ids. The trays are usually of two zes—a one-man 3x3-ft. tray or a two-man 3x6-ft. tray. The loaded trays are arranged one above the other, either by stacking directly on top of each other on the truck without any additional support or by sliding them in on guide rails arranged in a metal frame on the truck. In the smaller cabinets, individual trays are placed on guide rails one above the other. The free opening between trays should be 2½ to 3 in. to allow an unobstructed air flow through the vegetables.

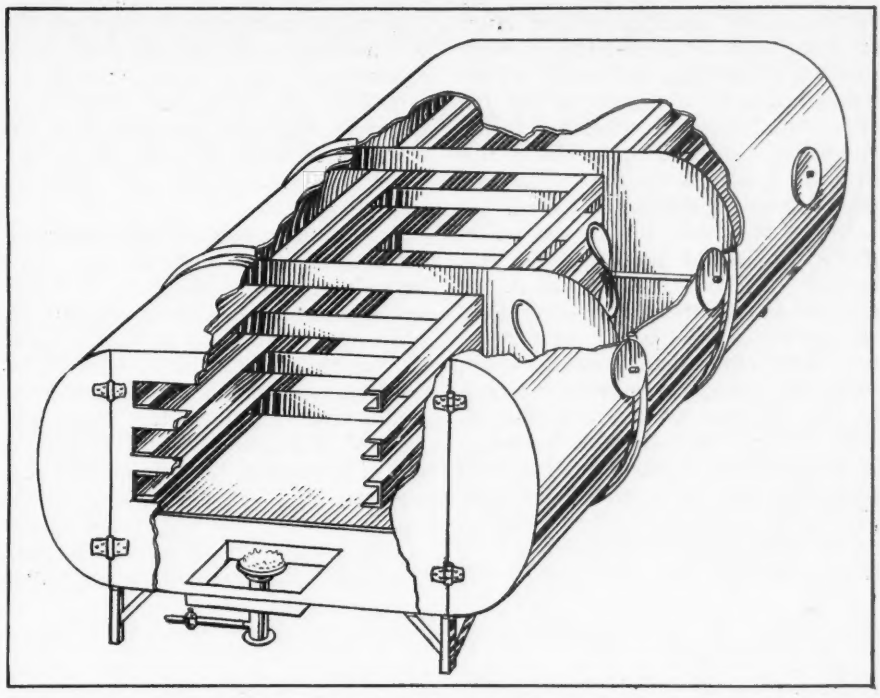


FIG. 2—Continuous through-circulation cabinet dehydrater equipped with sliding trays.

Cabinet Types

In order to illustrate more clearly how these various parts are assembled to form a cabinet and how they function, a brief description of several types of cabinet dehydraters is included. One of the smaller cabinet dryers developed for laboratory use is illustrated in Fig. 1.

The double walls of this unit are made from sheet metal, and the spaces between walls are filled with rock wool to prevent heat losses. A motor-driven 24-in. multivane radial fan of the De-Bothezat type is used to give an air flow of 800 to 1,000 ft. per minute at a static pressure of 0.7 in. of water. Heat is supplied from a thermostatically controlled gas burner fitted with ceramic burner heads to insure complete combustion of the gas. This heater is placed under an opening in the bottom of the

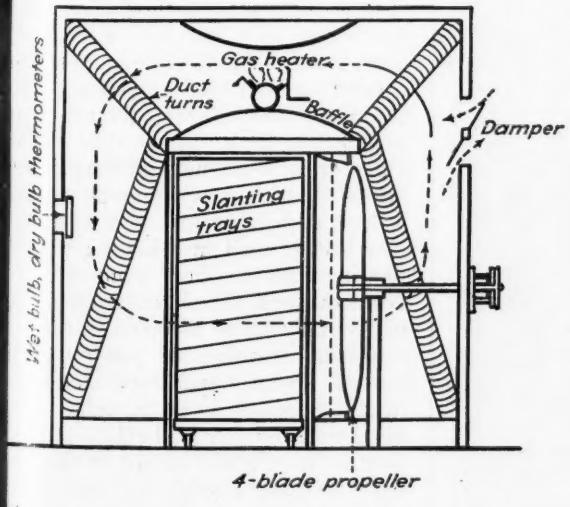


FIG. 3—Institutional-size cabinet dehydrater equipped with air-flame propeller.

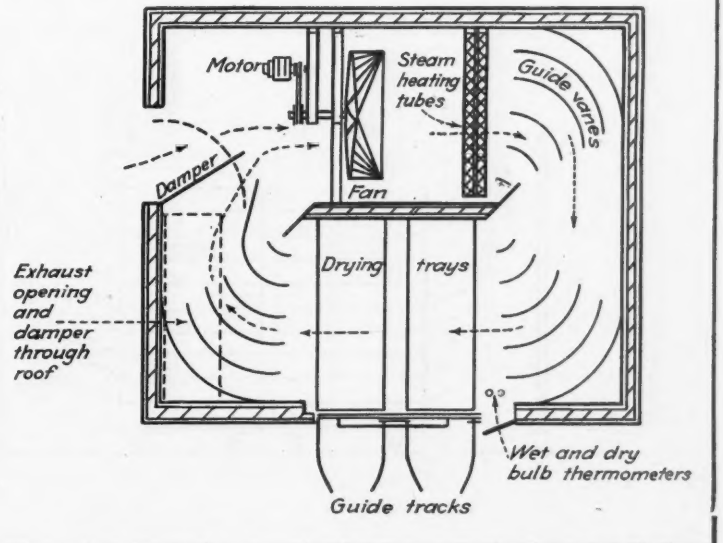


FIG. 4—Type J. A double-truck cabinet dehydrater which is heated with steam.

cabinet in such a position that the flames are not disturbed by the return air flow. Fresh air is admitted through this heater opening, and moist air exhausted through a damper at the fan end of the cabinet. Recirculation of the air is also controlled by means of this damper. Twelve metal trays 16x24 in., with wire-screen bottoms, are used.

When first built, the air was pulled parallel across the trays into the fan, because with this type of fan it was possible to maintain a more uniform air flow across the trays by using a suction flow rather than pressure. Later, baffles were installed between the trays for the purpose of directing the air down through the material in a slanting or perpendicular direction rather than across the trays in a parallel direction. The reason for this is that a perpendicular air flow gives a higher drying rate than a parallel flow, since under the former conditions the stagnant water film around each piece of wet vegetable is thinned down by the air stream to a greater degree than in the latter condition. This effect takes place only during the rapid stage of evaporation, and the direction of the air flow has little effect during the much longer slow diffusion stage.

A continuous-type cabinet dehydrater has been developed along the same lines by building three of the above described sections and bolting them together in one unit as illustrated in Fig. 2. Each section is equipped with a motor-driven propeller-type fan, thermostatically controlled heating system, duct turns, baffles and wet- and dry-bulb thermometers. The sides of the two outside sections are covered with metal sheeting, and three slots (the height and length of the trays) are cut into these four sides before the three sections are bolted together. After the sections are bolt together, lengths of angle iron are fitt into the ends of these slots to fo tracks on which to slide the trays. A metal trays with wire-screen bottoms a used and the air is forced down throu these trays by means of the slanti baffles. When the unit is filled, each the slots is closed by the sides of t trays so that a different temperatu humidity and air flow can be ma tained in each section.

With this arrangement, high init drying temperatures can be used in t first section, lower ones in the secon and proper finishing temperatures in t third. Loaded trays are pushed alt nately into the three slots of the fi section at scheduled time intervals 6, 7 or 8 minutes, to give total dryi time of approximately 2¾, 3¼ or hours, respectively. When complet filled, a tray pushed in at the inta end will push a finished tray out at t opposite end. This design is unique that it can be operated either on a bat basis for handling one or more tr of material, or on a continuous basis handling larger quantities. The capac therefore ranges from as low as 7 of fresh material in 3 hours' drying tim when operated on a batch basis, 1,400 lb. per 24 hours when operated a continuous basis.

A larger batch-type cabinet deh drater, with a capacity of 500 to 800 of prepared material every 3 to 4 hou has been developed for use by state a Federal institutions and as a pilot-plan scale dryer for commercial compani (Fig. 3). Double-walled insulated sid and top were made so that the sectio could be bolted together as a portab unit. A four-blade wooden propell 5 ft. 6 in. in diameter, is driven at 6 to 700 r.p.m. to deliver an air veloci of 800 to 1,000 ft. per minute as a su tion air flow. Four sets of duct tur are installed as illustrated, to insure uniform air flow through all trays. The duct turns can be made from eith sheet metal or wood. Intake and exhau dampers are provided to control recirc lation of the air. Direct-combustion pi gas heaters make inexpensive heati units for these cabinets, although steam heated fin-type coils, iron-pipe radiato or heat exchangers may also be used. new feature used in this cabinet is t slanting trays to direct some of the a down through the material rather tha horizontally across the trays in the co ventional manner as previously d scribed. Under actual tests, these slan ing trays seemed to act as well as tho fitted with the slanting baffles, and mo slanting trays could be put in the sam space than was possible with the paral trays and slanting baffles. If trucks fitte with guide rails are used, the rails c one side can be raised several inches

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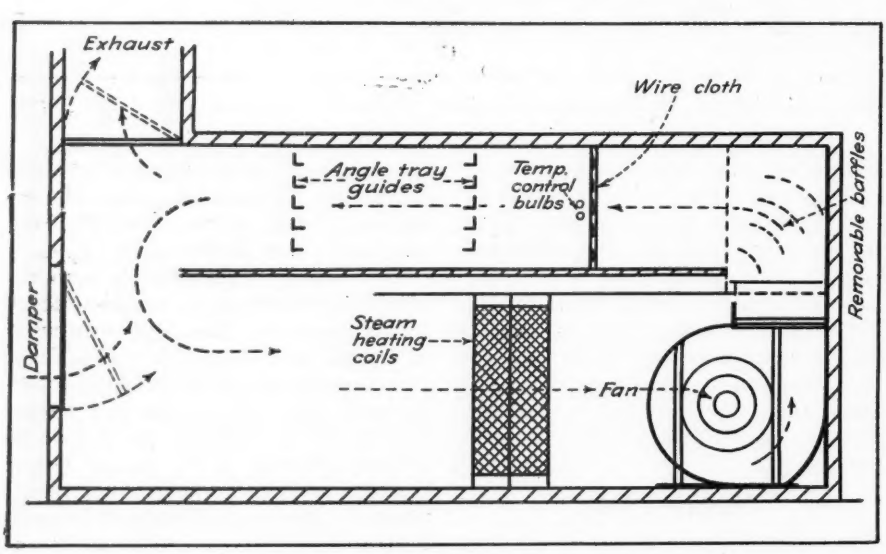


FIG. 5—Pilot-plant cabinet dehydrater.

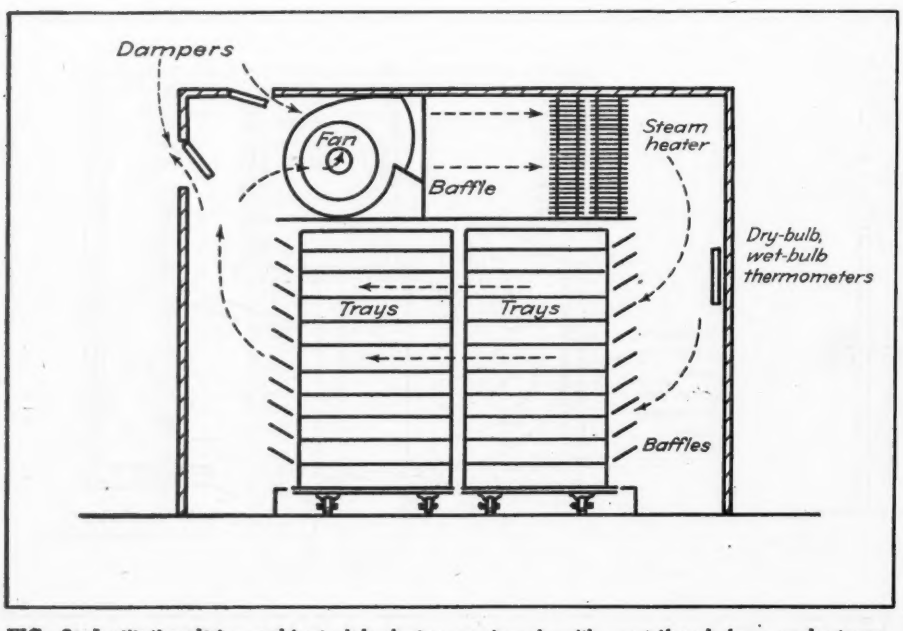


FIG. 6—Institutional-size cabinet dehydrater equipped with centrifugal fans and steam heater.

What Dehydrators of Carrots Should Do To Get Quality

By W. V. CRUESS, University of California, Berkeley, Calif.

Here is a discussion by an authority of the many factors and operations involved in the dehydration of carrots. The latest commercial practices are described. Treatment with bisulphite before dehydrating is recommended

DEHYDRATED carrots are one of the most important of the seven dried vegetables now being purchased by the Army. Owing to the fact that carrots can be grown there in quantity throughout the year, and to the availability of large grape and prune dehydraters, California went in rather heavily for the dehydration of this vegetable shortly after the declaration of war. Several new dehydraters for carrots have been built or are under construction. Several have expanded their facilities.

The principal difficulty with dehydrated carrots is their tendency to undergo undesirable changes in flavor and odor, and to lose their carotene, the deep orange-yellow color responsible for their vitamin A potency.

Varieties for Dehydration

The Red Cored Chantenay is preferred by the Army, and as a consequence probably more of that variety than of others is dehydrated. But the Imperator is also dried very extensively in California. The Chantenay is a plump variety of medium length, and normally of deep orange color "through and through." Frequently, however, it develops a green crown, and the green color may extend from one-fourth to one-third the length of the carrot. The green tissue dries to a brownish color.

The core of the Imperator is lighter in color than that of the Chantenay, but usually the light-colored core is narrow and is not very noticeable in the dried product. The Imperator usually gives a somewhat better drying ratio than the Chantenay and is of excellent flavor. It is a long, slender variety.

The Morse Bunching and Danvers Half Long are two other important fresh-market varieties that give very satisfactory dried products.

Through the efforts of the truck crops division of the University of California and the Associated Seed Growers, comparisons of carrot varieties have been made. The following data from Associated Seed Growers samples grown in a cool, foggy location near Milpitas, in central California, are typical:

Drying ratios: Long Imperator 8.21 to 1; regular Imperaor 7.81 to 1; Morse Bunching No. 31, 7.76 to 1; No. 122, 8.52 to 1; Red Cored Danvers, 8.65 to 1; Nantes, 8.33 to 1; Chantes, 9.21 to 1; Improved Chantenay, 8.03 to 1; Red Cored Chantenay, 8.79 to 1; and Short Top Shipper 8.15 to 1. The cooked weights for 10 grams of dry sample varied from 57.9 to 64.7 grams; that is, the ratio of cooked to dry ranged from 5.79 to 1 to 6.47 to 1, the Red Top Shipper being 5.79 to 1 and the Red Cored Chantenay 6.47 to 1. In other words, in most cases the dried carrots returned on cooking to only about two-thirds their fresh weight.

In a typical test with four commercial varieties grown at Davis, Calif. and harvested in the month of June, drying ratios were:

Morse Bunching, 7.8 to 1; Imperator, 7.73 to 1; Red Cored Chantenay, 9.84 to 1 and Danvers Half Long, 8.79 to 1. Harvested in July, the ratios were, in the above order: 7.5 to 1, 7.99 to 1; 9.94 to 1 and 8.75 to 1.

Effect of Climate

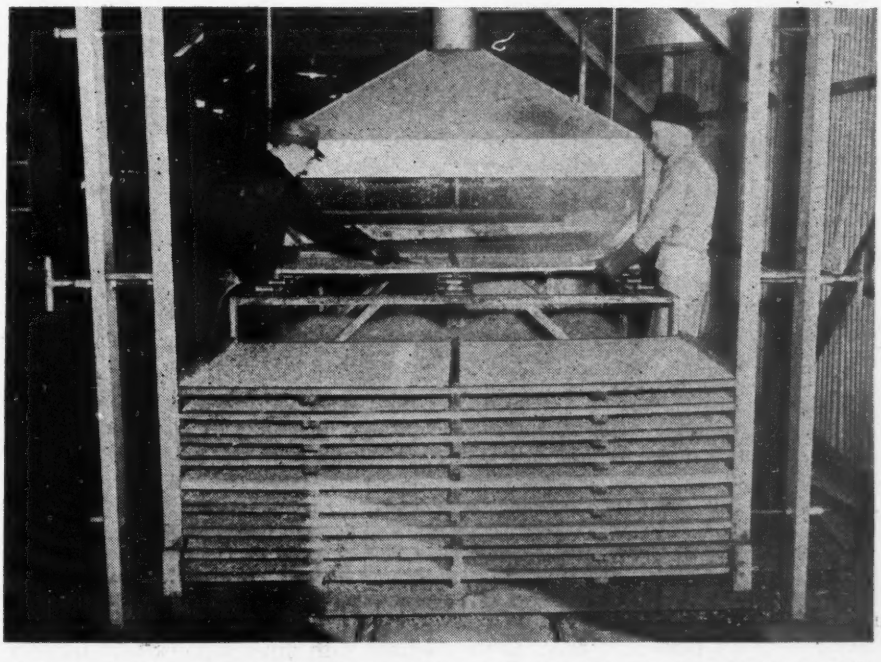
Carrots harvested during the rainy season in California were paler in color and lower in carotene than the same varieties harvested during late spring and during the summer. Also, in wet weather many of the Red Cored Chantenay carrots cracked open.

Imperator carrots grown in the hot Imperial Valley, and harvested in April and May, shriveled badly during transit to the dehydraters 200 to 500 miles distant, because of the very dry, warm atmosphere. They were therefore rather difficult to peel and trim, but were of good quality in other respects.

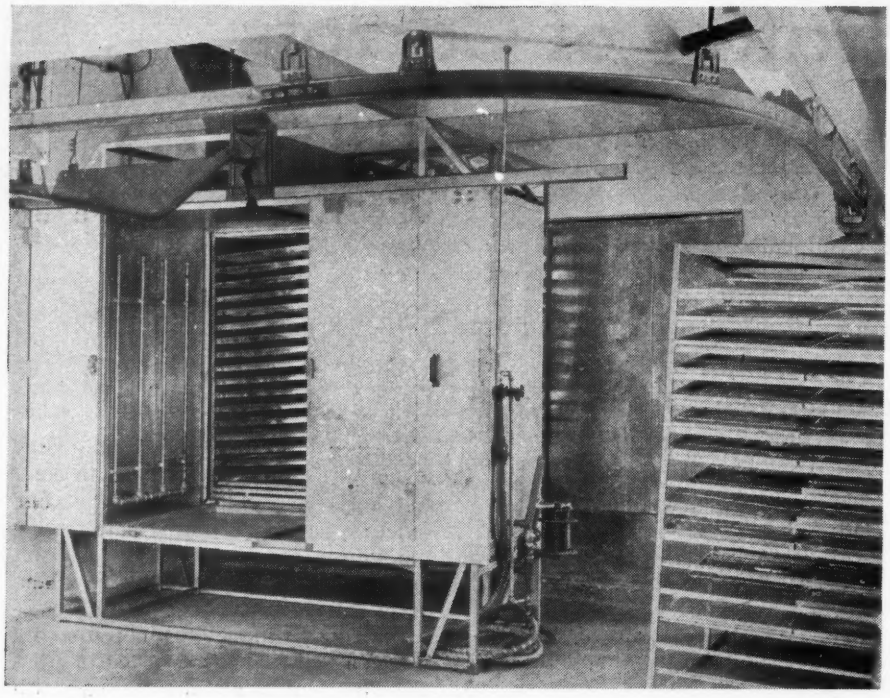
If left too long in the ground carrots in California are apt to develop "water core," in which the core becomes watery and depleted of sugar. It also develops an off-flavor and may become woody or pithy.

Peeling

The carrots are topped in the fields and delivered to the dehydrater in 50-lb. lug boxes or burlap grain bags. They are first "dry cleaned" by passage over a sloping grid of parallel ½-in. steel rods,



Workmen loading trays of blanched carrots at E. A. Couture plant, Modesto, Calif.



Blanching cabinet, and an overhead car with metal trays at right on the monorail conveyor—R. H. Osborne Co., Pasadena, Calif.

or through a revolving, cylindrical squirrel cage made up of parallel rods, to remove as much of the adhering sand or soil as possible. The squirrel cage does the better job.

In most plants the carrots next drop into a tank of water, or travel under sprays of water, and then pass to a powerful brush or drum washer. This may be a Paramount Junior potato washer consisting of revolving cylindrical brushes and rubber fingers and is supplied with heavy jets of water. This washing removes most of the soil. If not removed, the soil forms a sludge in the lye peeling tank and "gums up" the peeler.

"Early in the game" most dehydrators peeled their carrots in the familiar abrasion potato peeler of the type commonly used in large hotels. Another abrasion peeler, consisting of abrasive-coated, rapidly revolving, horizontal rolls about 3 in. in diameter is also used. In both peelers, sprays of water wash away the abraded peels.

The Beech-Nut Co., Rochester, N. Y., has used a flame peeler in which the peels are roasted in the flame and then removed by sprays of water and agitation. Results were said to be satisfactory.

Practically all vegetable drying plants in California now use lye peeling. It is applied in two ways. In one method, a straight soda lye solution of 3 to 6 percent flake caustic is used. The carrots are conveyed through a shallow tank of the boiling lye, or through sprays of the boiling lye. In the second method, the boiling point of the lye, usually 6 to 15 percent caustic, is increased to about 220 deg. F. by adding salt. The elevated boiling point hastens peeling, and the high concentration of salt tends to prevent too deep penetration by the lye. The period of exposure to this solution is about 15 seconds or less, and in the dilute lye without salt it is about 30 to 60 seconds.

Washing

Following the lye peeler, the carrots are washed free of disintegrated peel and lye in a rotary drum washer under very heavy sprays of water. This may be followed by spraying with water on a metal cloth belt conveyor. The surface of the carrots is practically free of lye.

Loss by lye peeling is much less than by abrasion peeling "something of the order" of 10 percent, against 20 to 30 percent.

Trimming

In one plant the peeled carrots drop from the washer onto a slowly moving rubber belt about 3 ft. wide. Untrimmed carrots are conveyed in two lanes at the sides. The roots and crowns are cut off and bits of peel and blemished portions are removed by women standing at each side of the belt. The trimmed carrots are then placed in the central lane. In this plant 16 to 20 women trim about 1¼ to 1½ tons of carrots per hour.

Waste Disposal

The trimmings are collected and are taken away at least once a day, usually more frequently, for livestock feed. Mixed with other rations, they make a useful dairy feed.

The wash-water from the peeli[ng] line from most plants enters the city sewage system. In at least one case is run into a shallow basin area in a field and allowed to soak into the so[il]. This is apt to result in disagreeab[le] odors, but is much less objectionab[le] in this respect than is the case wi[th] potatoes.

Cutting

Most carrots for Army use are n[ow] cut mechanically into ⅜-in. dice. F[or]merly some were cut in Julienne strip[s] but this practice was discontinued b[e]cause a much greater weight of dri[ed] diced carrots than of strips can [be] packed in a 5-gal. can. The well-know[n] Urschel dicer of the canning indust[ry] is generally used. It does a neat job a[nd] has great capacity.

Blanching

Most of the blanchers in use i[n] northern California are of the contin[u]ous type, and have been built on th[e] job. They consist of a metal-cloth co[n]veying belt traveling through a shallo[w] box made of waterproof plywood or [a] galvanized sheet metal. Wood is th[e] more common, as sheet metal is on th[e] critical list. Steam in generous volum[e] enters from top and bottom. In south[-]ern California, the blancher is usuall[y] a metal cabinet holding one to thre[e] carloads of trays on which the carrot[s] are blanched. Steam enters from th[e] sides and bottom.

In both types of blanchers, th[e] blanching lasts long enough to destro[y] the peroxidase enzyme, as judged b[y] testing with dilute benzidine and hydro[-]gen peroxide solution. In the continu[-]ous blancher this is usually 6 to [7] minutes. In a typical southern Califor[-]nia plant, the carrots are spread o[n] screen trays with metal frames whic[h] are held in a metal frame car on a[n] overhead trolley, and blanching is don[e] in a steam cabinet. The car enters th[e] steam box, the door is closed tightl[y] and the steam is turned on full blast[.] The temperature rises quickly to 21[0] to 215 deg. F, and is held for 2 min[-]utes at above 190 deg. F. The steam [is] then turned off and the doors opened[.] The carrots remain at blanching tem[-]perature for probably another hal[f] minute or more.

Drying Trays

Some plants load slat-bottom wooden trays at about 1½ lb. per square foot. In the Couture plant in Modesto, Calif., the loading is about 1¾ lb., and in one southern California plant it is 2¼ to 2½ lb. In most plants the trays are filled automatically from the blancher or dicer and leveled off by hand.

In northern California the trays are usually 6x3 ft. in size, and made of

white pine slats. They are stacked on low, four-wheeled trucks resting on steel rails set in concrete. There normally are 6 trays per truck, which gives about 600 lb. of fresh carrots, or about 80 to 90 lb. of dry carrots, per truck.

In southern California the carrot trays are usually of hardware cloth on steel frames, and are carried in overhead, single-track cars. The trays are usually 3x3 ft. in size.

One California plant blanches in a cannery retort at 240 deg. F, as does also the Beech-Nut Co. in Rochester. This gives excellent results but entails more labor.

Dehydraters

The straight tunnel prevails in northern California for drying carrots. It is usually 50 to 60 ft. long. There are also several of this type in southern California. In that section, however, the design varies considerably. In some cases, cabinet dryers are used for the first stage and a tunnel for the second. One plant uses a battery of International tunnels about 30 ft. long. (See articles by W. B. Van Arsdel, FOOD INDUSTRIES, October, November and December, 1942, for a full discussion of dehydrater types.)

Drying

In northern California the single-stage counter-current drying cycle is used. In the Couture plant, for example, which has two Puccinelli type tunnels, 6x3-ft. trays and cars on double rails are used. The carrots enter at a temperature of about 120 to 126 deg. F. dry bulb and 88 to 91 deg. F. wet bulb. They progress slowly toward the hot end, where drying is finished at an average temperature of about 155 deg. F. dry bulb and 88 to 91 deg. F. wet bulb. The carrots are dried to less than 5 percent moisture in 9 hours, the normal drying time in this plant. The air velocity, measured between trays, is from 600–800 lineal feet per minute—an exceptionally good velocity.

In one southern California plant, that of the California Vegetable Concentrates Co., an unusual cycle, somewhat as follows, is used. The carrots enter the cool end of an International tunnel and progress counter-current, emerging in air at 210 deg. F. dry bulb and 106 deg. F. wet bulb; in tunnel No. 2 (the second stage), they emerge counter-current in air at 165 deg. F. dry bulb and 110 deg. F. wet bulb and in No. 3 (the third stage), at 145–140 deg. F. dry bulb and 110 deg. F. wet bulb. They are in tunnel No. 1 for 100 minutes, in No. 2 for 100 minutes and No. 3 for 200 minutes. They are then transferred to finishing bins, where they are finished at 125 deg. F. in air of low velocity—about 75 ft. per minute. The air from tunnel No. 1 is at practically 100 percent relative humidity. The decrease in weight in the first tunnel is about 50 percent.

In another southern California plant, the carrots are held at 203 deg. F. for about 3 hours in a cabinet dryer, where they lose about 40 percent of their moisture. They then enter a counter-current tunnel at 150 deg. F. dry bulb and 110 deg. F. wet bulb and progress to a final exit temperature of 175 to 180 deg. F. dry bulb and 110 deg. wet bulb. They then contain about 10 percent moisture. Drying is completed in bins at 130 deg. F. It is planned, however, to install a silica gel unit for dehydrating the air used in the bins and to operate them at 110 deg. F.

One plant is now using finishing bins supplied with air desiccated in a silica gel unit.

Insofar as this writer could judge, carrots dried by these various methods were not damaged in quality by the drying procedure.

Sorting the Dried Carrots

The dry carrots may be scraped from the trays into a bin from which they are elevated by a bucket conveyor to an inspection belt, or they may be emptied directly onto the belt. Girls, usually two to four, remove defective pieces. The inspected dehydrated carrots in the Couture plant fall from the belt across an 8-mesh screen that removes fines. The fines are sold for use in carrot drinks and other products.

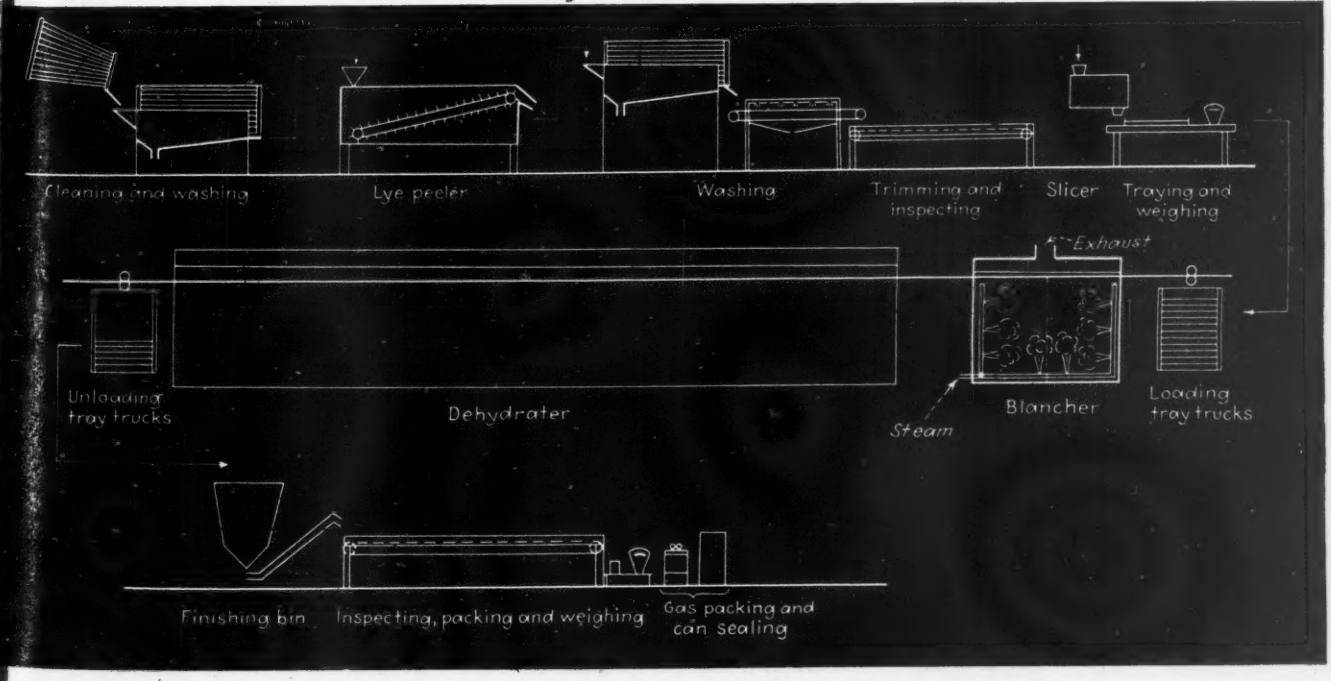
Packing

From a hopper or bin the carrots are filled into 5-gal. cans, 17½ lb. per can. Some "jouncing" of the can is needed to get this fill.

A tube attached to a CO_2 cylinder is introduced into the bottom of the can, and gas is allowed to flow until most of the air is expelled. This is occasionally tested by a lighted match or candle—the escaping CO_2 snuffs out the candle

(Turn to page 129)

Editor's Note—*Since this article was written, the important new Spiegl plant has started operation. (See "New Dehydration Plant Handles Record Quantities," FOOD INDUSTRIES, Dec., 1943.)*



Flow diagram for carrot preparation and dehydration in a California plant.

Isolation of Carotene from Sweet Potatoes

By J. F. VILLERE, D. C. HEINZELMAN, J. POMINSKI and H. R. R. WAKEHAM
Southern Regional Research Laboratory,* New Orleans, La.

Sweet potatoes are a possible source of carotene. Three of the methods which show promise for large-scale operation have been investigated and are reported by government technologists

Laboratory extraction and isolation of carotene by the acetone extraction method

IT is well established that yellow varieties of sweet potatoes contain relatively large amounts of carotene, or provitamin A.[1, 2] In breeding for high carotene content, Miller and Covington[3] have obtained sweet potato seedlings containing as much as 151.5 micrograms of carotene per gram of fresh sample. Matlack[4] isolated carotene in the crystalline form from sweet potatoes and identified it as the beta isomer, which has approximately twice the vitamin A activity of alpha carotene. Mixed chromatograms with known samples of alpha and beta carotene showed in the present investigation that the carotene isolated from sweet potatoes was likewise the beta isomer. The present report describes several methods for the isolation of crystalline carotene from sweet potatoes.

Acetone Extraction Method

This method is based on the procedure described by Guthrie[5] for the isolation of carotene from carrots. The finely ground fresh tissue is successively extracted with acetone. The first two extractions dehydrate the tissue but remove little carotene, while the subsequent two or three extractions remove most of the carotene. The carotene crystallizes from these extracts on dilution with about one-fifth volume of water and may be purified by recrystallization. Details of a typical experiment are as follows:

Sweet potatoes (*Ipomea batatas*, Poir) of the Puerto Rico variety, containing 43 mg. of carotene per kilogram, were ground to a pulp in a hammer mill. The AOAC spectrophotometric method[6] was used to determine this and subsequent carotene values. A 10-kg. lot of the pulp was thoroughly mixed by mechanical means for one hour with 15 liters of acetone. The mixture was filtered through heavy white duck on an earthenware suction filter. The filtrate (Extract 1), which had a volume of 14.5 liters and contained 13 mg. of carotene, was not processed further. The residue was thoroughly mixed for one-half hour with 8 liters of acetone and then filtered as above. The filtrate (Extract 2) had a volume of 10.1 liters and contained 73 mg. of carotene. It was mixed with 1.5 liters of water and allowed to stand for two days. The very impure carotene was separated by filtration and purified by solution in petroleum ether and crystallization on the addition of absolute ethyl alcohol. The product was 25 mg. of crystalline carotene of 80 percent purity.

The residue, which still contained most of the carotene, was extracted three more times with 8-liter lots of acetone as described above. The three filtrates (Extracts 3, 4 and 5) had volumes of 7.1, 6.8 and 10.8 liters, and contained 148, 100 and 66 mg. of carotene, respectively. They were combined, diluted with 5 liters of water, allowed to stand overnight, and the crude crystalline carotene filtered out on hardened paper. The product weighed 616 mg. and had a carotene content of 42 percent, or 259 mg. of pure carotene. It was dissolved in boiling petroleum ether, filtered, evaporated to about the saturation point, diluted with almost an equal volume of absolute alcohol, and evaporated further to remove most of the petroleum ether. After cooling in an ice bath, the carotene crystals were filtered out on hardened paper. This product weighed 185 mg. and had a carotene content of 90 percent, or 167 mg. of pure carotene. If the 25 mg. of crystalline carotene of 80 percent purity from the second extract is included, the yield was 43 percent of that present in the original sweet potato pulp.

In the above experiment, 424 mg. out of the original 430 mg. of carotene was accounted for by analysis of the products, filtrates and residues; 400 mg., or 93 percent, was accounted for in the five extracts; 24 mg., or 6 percent, remained in the residue; and 6 mg., or 1 percent, was lost. Since it is not worthwhile to process the second extract for carotene, it is best to evaluate the method on the yields of the third, fourth and fifth extracts. On this basis, 60 percent of the carotene in the sweet potato sample was obtained from these three extracts as a partially crystalline product of 42 percent purity. After recrystallization of this product, 39 percent of the original carotene was ob-

*Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

tained as a crystalline product of 90 percent purity.

Since acetone is a more expensive solvent than alcohol, the latter solvent was tried for the preliminary extraction to remove water and impurities prior to extraction of carotene with acetone. In this experiment 1 kg. of carotene-rich ends of sweet potatoes containing 52 mg. of carotene was ground in a food chopper and mixed in a Waring Blendor with 1.5 liters of 95-percent alcohol. The material was filtered and the extraction repeated twice with 1.0-liter lots of the alcohol. These preliminary alcohol extractions removed only 7 mg. of carotene and were discarded. The residue was then extracted with acetone, first with 1.5 liters, and later with 1.0 liter, mixed in a Waring Blendor and filtered as before. On adding one-fifth volume of water to the combined acetone extracts and allowing to stand overnight, the carotene crystallized and was filtered out on hardened paper. The yield was 43 mg. of a crystalline carotene product having a purity of 72 percent and representing 60 percent of the carotene contained in the sweet potato pulp.

Mechanical Concentration Method

Since a large part of the cost of isolation of carotene from sweet potatoes is due to the use of organic solvents, some way was sought to reduce the required amount of such solvents by increasing the carotene concentration of the sweet potato material prior to extraction. It has been shown by Weier[7] that carotene occurs in carrots in discrete particles and frequently as crystals. Microscopic examination showed that carotene occurred in a similar manner in sweet potato tissue, although the crystals were not so large or well formed as in carrots. This observation suggested that the parts of the cells containing these particles might be separated to some extent by dispersing the tissue in water or other aqueous media and centrifuging. It was found that such a procedure yielded a material containing two to four times as much carotene per kilogram as the original tissue.

In one experiment, 40 g. of ground sweet potato tissue containing 98 mg. of carotene per kilogram was dispersed in a Waring Blendor for 10 minutes with 100 ml. of water containing 0.1 percent of Duponol C, a dispersing agent. The dispersion was centrifuged at a moderate speed for a few minutes to bring down starch and fiber but to leave the more finely divided materials, including most of the carotene, in suspension. After decanting the supernatant liquid, the residual pulp and starch were mixed with water, centrifuged, decanted and the process repeated. The combined liquids had a volume of 440 ml., part of which was mixed with 50 ml. of 1 N sulphuric acid, allowed to stand 15 minutes and centrifuged. The precipitate weighed 5.6 g. and contained 220 mg. of carotene per kilogram.

In another experiment, 50 g. of sweet potato tissue that had been ground in a hammer mill and contained 47 mg. of carotene per kilogram was stirred with 100 ml. of 0.1 percent Duponol C solution for 5 minutes and lightly centrifuged for 5 minutes. The residue was mixed with 100 ml. of water, centrifuged lightly and the process repeated. The combined supernatant liquid had a volume of 250 ml. It was mixed with 65 ml. of 1 N sulphuric acid, allowed to stand 15 minutes, and the coagulum centrifuged down. The coagulated material weighed 8 g. and contained 155 mg. of carotene per kilogram. In this manner, about one-half of the carotene was obtained in one-sixth the mass, and a three-fold concentration was effected.

On a somewhat larger scale 2.5 kg. of sweet potatoes containing 66.5 mg. carotene per kilogram was ground in a food chopper. This material was dispersed in batches in Waring Blendors, using 200 ml. of 0.1 percent Duponol C solution for each 100 g. The mixture was centrifuged at moderate speed for 1 minute, and washed twice with water as described above. The combined supernatant liquid and washings amounted to 8,800 ml. This was mixed with 2,200 ml. of sulphuric acid and placed in a refrigerator overnight. The next day much of the supernatant liquid could be decanted from the coagulum prior to separation with the centrifuge. The moist concentrate weighed 337 g. and contained 244 mg. of carotene per kilogram, accounting for approximately one-half of the carotene in the sweet potato processed.

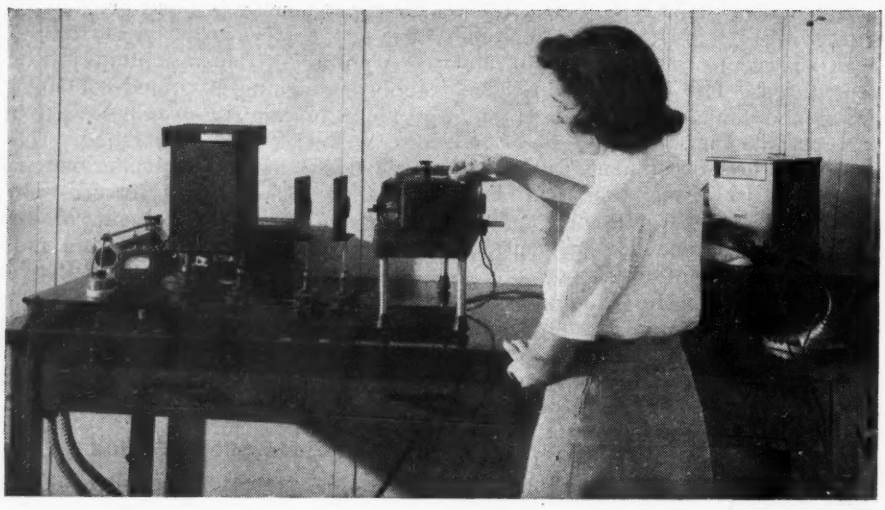
A portion of the concentrate just described, weighing 40 g. and containing 9.8 mg. of carotene, was processed by the acetone extraction method. The yield was 5 mg. of crystalline material containing 3.7 mg. of carotene. This corresponded to 38 percent of the carotene in the concentrate and indicated a yield of 19 percent of that in the original sweet potatoes. It seems likely that work on a larger scale using a procedure specifically adapted to this type of concentrate would give better results.

Adsorption Method

In this method, the sweet potatoes are pulped, dried, ground and extracted with petroleum ether. The carotene is removed from the petroleum ether by adsorption on a column of activated alumina, from which it is eluted with petroleum ether containing methyl alcohol and crystallized by concentration of the elutriate. The details of a typical experiment follow:

Puerto Rico sweet potatoes, 167 kg., were pulped in a swing hammer mill through a plate with 0.25-in. perforations. These sweet potatoes contained a total of 9.78 g. of carotene by analysis. No detectable loss of carotene occurred during the pulping. The wet pulp was dried in a gas-fired rotary shell dryer using the intermediate feed drying system with the incoming gases at 224 deg. C., the outgoing gases at 84 deg. C., and a feed rate of 20 kg. per hour. The dried material weighed 51.8 kg. and contained 5.69 g. of carotene, having lost 42 percent of its carotene during the drying process. A quantity of the dried product weighing 38.6 kg. and containing 4.25 g. of carotene was

Extraction and chromatographic separation of carotene by the adsorption method



Chemist evaluating the carotene content of sweet potatoes spectrophotometrically.

extracted with Skellysolve F (petroleum ether, b.p. 35-60 deg. C.). This was accomplished by flooding the sweet potato flour with the solvent in a large metal container. After standing for an hour the drain was opened to allow percolation. Fresh solvent was added as soon as the top of the sweet potato flour was exposed. The extraction required two days since the ground material was kept covered with the solvent overnight. Most of the extractable carotene was contained in the first 35 liters of extract, while 2.6 g. of carotene was retained by the sweet potato material and not readily removed by the extraction procedure used. The extract contained 950 g. of solids other than carotene. About 25 liters of the solvent was retained by the sweet potato flour.

The carotene was removed from the petroleum ether solution by adsorption on activated alumina (20 to 60 mesh) in two glass columns in series. Each column was 7 cm. in diameter, 88 cm. high and contained 3.2 kg. of alumina. The solution was passed through the columns by gravity at the rate of about 25 liters per hour. The liquid coming from the columns was light yellow due to pigments that were not adsorbed. When the process was complete the entire first column and the upper part of the second column were bright red where the carotene had been adsorbed.

Each column was eluted with 4 liters of petroleum ether containing 10 percent methyl alcohol. After elution, the alumina may be regenerated by washing with acetone, drying in air and heating at about 200 deg. C. or better at about 500 deg. C. for four hours. The elutriate was washed in a separatory funnel with 90 percent methyl alcohol followed by water to remove xanthophylls and other pigments, and dried over anhydrous sodium sulphate. The dark red solution was concentrated in a vacuum still from 5.5 liters to about 0.5 liter. It was transferred to a large beaker and heated to boiling. Methyl alcohol was added gradually with stirring while boiling off the petroleum ether. When the mixture was about half methyl alcohol, it was allowed to cool. The carotene crystallized on standing. The first crop was 1.15 g. and the second crop was 0.25 g. The purity of the product was 76 percent, and the calculated yield of pure carotene was 1.07 g. This quantity is about 13 percent of the carotene present in the original sweet potato or 27 percent of that present in the sweet potato flour at the time of extraction.

Although the carotene yield in the adsorption process just described is low, there is much room for improvement. Since the greatest loss took place during the drying of the sweet potato material, it seemed likely that the loss could be greatly reduced by drying at a lower temperature as recommended by Lease and Mitchell.[8] A second batch was dried in the rotary drier with the incoming gases at 190 deg. C. at a feed rate of 20 kg. per hour. The carotene loss during drying was 22 percent or about half that found in the first trial. Increasing the temperature of the incoming gases to 220 deg. C. and the feed rate to 40 kg. per hour resulted in a loss of 28 percent of the total carotene. The next largest loss was due to incomplete extraction. Experiments indicated that this loss could be reduced by grinding, but use of the finer flour increased solvent retention and reduced the rate of solvent flow. The most promising method of reducing the loss due to incomplete extraction appeared to be the addition of 10 percent by volume of methyl alcohol to the petroleum ether. Grinding and extracting with this solvent mixture reduced the extraction loss to 12 percent as compared to 35 percent found in the experiment described above, but the sweet potato flour caked badly and the solvent percolated very slowly. The mixed solvent extraction also removed more noncarotene material which increased the crystallization losses later in the process. It was found that the methyl alcohol was retained by the flour when a mixture of 10 percent methyl alcohol in petroleum ether was passed through, so that further treatment of the extract was not necessary prior to passing it through alumnia to absorb the carotene.

In this process, it was found that the maximum carotene absorbed by 20- to 60-mesh alumina was about 0.4 g. per kilogram of adsorbent. Using finer alumina increased the retentiveness but decreased the solvent flow, while coarser alumina permitted part of the carotene to pass unadsorbed.

Discussion

It is of interest to compare sweet potatoes with carrots as a source of carotene. Some varieties of carrots contain 80 to 96 mg. of carotene per kilogram of fresh weight,[9] while sweet potatoes of the Puerto Rico variety contain from 40 to 80 mg. per kilogram. However, some genetic crosses of sweet potatoes selected for carotene content contain as much as 152 mg. per kilogram.[3] Willstätter and Stoll[10] found that 5,000 kg. of carrots yielded 125 g. of crystalline carotene or 25 mg. per kilogram. Holmes and Leicester[11] obtained 37 mg. of carotene per kilogram of canned carrots. Guthrie[5] obtained 230 mg. of about 90 percent purity from 6.5 kg. of carrots or about 32 mg. per kilogram, while the same acetone extraction method applied to sweet potatoes, as described in this paper, yielded 18 mg. of carotene per kilogram. Since solvent losses and labor would be the main cost in processing for carotene, it appears that carrots with a higher carotene content than sweet potatoes have an advantage for this purpose in spite of the lower cost of the latter. Should varieties of sweet potatoes of higher carotene content come into commercial production this situation might be reversed.

The acetone extraction method appears to be the easiest for obtaining carotene from sweet potatoes in the laboratory, but for work on a large scale the amount of acetone required is a disadvantage. Its use would require a very efficient solvent recovery system. The adsorption method may offer more promise for work on a large scale, but it would be necessary to improve the yield by elimination of certain losses, especially the loss of carotene during the drying of the sweet potatoes. The mechanical concentration method could possibly be utilized for obtaining carotene as a byproduct in the processing of high-carotene sweet potatoes for starch, canning or flour or in the utilization of

(*Turn to page 130*)

Preserver Reports Success With SO_2 Preserved Citrus Pulp

By B. T. BRANHAM, Old Virginia Packing Co., Front Royal, Va.

This is an informal report to the industry by one manufacturer who has made marmalade for domestic use from SO_2 preserved citrus pulp. The possibility of a large consumer demand for this product in the United States is seen

OF all the fruits preserved with sulphur dioxide and packed in oak barrels for Lend-Lease, citrus pulp for subsequent marmalade manufacture seems the most promising for a domestic postwar product.

Thousands of barrels of grapefruit and orange pulp recently were released to American preservers for the manufacture of citrus marmalade for domestic consumption. Under wartime conditions the product has enjoyed immediate acceptance from the trade, and a permament consumer demand probably will be established.

The citrus fruit industry should welcome and foster the increased outlet for oranges and grapefruit in marmalade, so that the present packers may continue to manufacture citrus pulp for American firms after their Lend-Lease contracts are filled. The release of the citrus pulp is not only of potential market value to the citrus fruit industry but of immediate value to the preservers who have had difficulty in getting any sort of fruit for preserves or jellies.

As one of the many preservers who were allotted citrus pulp under FSC contract, our experience in handling the material should be of interest, especially as we were new at packing this type of marmalade.

As preservers, we packed the marmalade to FSC specifications, and after it had been inspected and passed by the government, it was released back to the preserver for sale to the trade at $2.65 for a dozen 2-lb. jars.

The specifications were as follows: The material was to be used on a basis of 28 lb. of pulp mixture with 65 lb. of sugar and cooked to a minimum of 65 percent solids. The 28 lb. of pulp was to be on a standard basis of two parts of grapefruit adjusted to 9.1 percent solids and one part of orange adjusted to 12.5 percent solids. A yield of 90 lb. of marmalade was set as minimum.

It was required that the packer keep records of the pulp received, the soluble solids, and the weight of the pulp on an adjusted solids basis. A further requirement was that the finished marmalade contain a maximum of 30 parts per million of sulphur dioxide. The barrel labels declared a trace of phosphoric acid and sulphur dioxide, and the preservers were informed that if the pulp received a hard boil for five minutes in the cooking kettles the sulphur dioxide in the finished product would be less than the 30-p.p.m. maximum.

It was at first proposed that the citrus pulp be made into marmalade in the proportion of three parts of grapefruit to one part of orange, but this was afterwards changed to two parts of grapefruit pulp to one part of orange pulp. Then this requirement to use two parts of grapefruit to one of orange was again modified so as to use up all the pulp received by the preservers.

Plant Operations

In order to mix the pulp evenly and to facilitate handling, as well as to cook out sulphur dioxide, we dumped eight barrels of grapefruit and four barrels of orange pulp into a tank equipped with open coils. Five hundred gallons of water was run into the tank before putting in citrus pulp. The mixture was brought to a vigorous boil for five minutes, and then pumped to the cooking kettles.

The solids content was read on a refactometer and the volume of pulp used per cook was corrected so that the ratio of standard pulp to sugar would be the same as that designated by the government, that is, 28 lb. of the standard pulp mixture to 65 lb. of sugar. As we used 500 lb. of sugar per cook, we needed 216 lb. of pulp on a corrected solids basis.

Measuring was more convenient than weighing, so we transposed the 216 lb. of pulp mix into 50 gal. of an approximate 5.1 percent mixture, using from 45 to 55 gal. according to the solids content.

After operating for several days on the above basis, we found that the pectin

(*Turn to page 117*)

Mix No. and Date	Grapefruit Pulp			Orange Pulp			Water Added Gallons	% Solids of Mix	Gallons Mixture Per Cook	Pounds Sugar Per Cook	Number of Cooks	Yield Per Cook	Cases Per Cook	% Solids	% SO_2
	Bbl. Nos.	% Solids	Net Wt.	Bbl. Nos.	% Solids	Net Wt.									

Form used to keep the records of the pulp and product as required by the FSC.

Typical forms of beetles and weevils which infest whole grain in storage.

Dusts Will Kill Grain Weevils

Nontoxic inorganic dusts are potent in protecting stored grain from insect damage. They have important wartime possibilities

By G. W. CASS,
Middlesex, England

SOME interesting research on the use of fine dusts as insecticides, particularly in dealing with the grain weevil and similar pests, has lately been recorded by Prof. H. V. A. Briscoe, of the Imperial College, in two lectures delivered in London.

The use of dusts as insecticides is of wide interest, even though their use must be confined to the storage of whole grains or other raw materials which will be thoroughly cleaned before processing.

One method used by Professor Briscoe in testing the potency of dusts as insecticides was to mix with 50 grams of wheat containing approximately 14 percent moisture, in equilibrium with air of about 70 percent relative humidity, a weighed amount of the dust under test. This was usually 1 percent by weight of the wheat. Fifty healthy adult weevils, selected at random from a large number, were put on the prepared wheat in a tube closed with muslin and kept in a cabinet thermostatically held at 73.4 deg. F. At intervals of perhaps two to three days the contents of the tube were examined by separating the weevils from the wheat, and the dead were counted. The weevils were then returned with the original wheat to the tube and the experiment continued. It was found, as was expected, that dosage is an important factor but that the chemical properties of the dust are unimportant.

Silica dust has been most generally used up to now, as it is inert and nontoxic. In the present work a large variety of materials has been tested, including fine diamond dust thoroughly purified by treatment with benzene or other solvents. This and carborundum dust proved very effective in killing weevils, and it was concluded provisionally that the lethal action of mineral dusts is purely physical, and that it is a surface action affecting the outer casing or cuticle of the insect. It was found, too, that humidity here plays an important part.

Close attention must be paid to methods of grinding the powders, to particle size distribution, and to particle surface characteristics. Much more work remains to be done, particularly with respect to methods of grinding and the effects of these on the resultant particles. The powders should be subjected to close microscopic study, and probably there is scope here for the electron microscope technic.

Inorganic dusts closely approximate colloids. Two dusts may be identical in chemical composition, particle size and crystalline structure, yet differ markedly in their action on insects.

Particle size governs the degree of adhesion of the dust, but particle surface and shape characteristics are still more significant. Dusts with a hardness of 3 or less on the Moh scale were found to be largely ineffective, and those of the diamond class of hardness—10 on the Moh scale—were most effective. Such hardness enables the particles to maintain a sharp or jagged configuration even on a submicroscopic scale.

In the search for a dust insecticide for production on a large scale the following conditions must be fulfilled:

1. Hardness of the material must be at least 6.5 (Moh's scale), that is, harder than Pyrex glass.
2. The dust must be very fine, with particles mostly under 10 mu and a large proportion between 1 and 5 mu.
3. It would be well if the dusts did not contain free silica, so as to eliminate the risk of silicosis among the workers making or using it.
4. The raw material must be reasonably cheap and plentiful, at least to the extent of several thousand tons per annum.
5. The raw material must be free from poisonous elements.

Tests were made with a wide variety of materials, and the most suitable was provisionally found in coal ash clinker. Wet grinding appeared to be by far the most effective.

Some work in this direction has already been described.[1] Wet and dry grinding have been thoroughly compared in respect to efficiency, and it has been established that the nature of the liquid used in wet grinding is immaterial except as it affects speed of grinding. The difference in insecticidal efficiency between wet and dry varies with the material ground. It is large for quartz, clinker and magnesite, but practically nil with sapphire, rutile and activated gas mask carbon. Precipitated material chemically prepared will often be as effective as wet-ground material. The so-called micronized powders, in which the fine powder is removed continuously from the mill by air current, are no better than the wet-ground products.

Effect of Dusts on Insects

Other insects to which the results of this work may be applied include the rice weevil, flour beetles, Mediterranean flour moth, fig moth, cocoa moth, the meal worm, the saw-toothed grain beetle, the spider beetle and the bed bug.

In conclusion the lecturer referred briefly to the attempts which are being made to explain the insecticidal action of fine dusts by more thorough examination of the structure of the insect cuticle. According to Pryor and others, it seems that the epicuticle, like the egg case (ootheca) of insects, is an unreactive protein tanned, for example, by an orthoquinone and subsequently impregnated with lipoid substances. It is this epicuticle which is responsible for retention of the water which is necessary to main the water-balance in insects. Professor Briscoe is convinced that the lethal action of dusts depends on reducing the permeability of the insect's epicuticle to water.

Reference

1. Kitchener, Alexander and Briscoe, *Chemistry and Industry* (London), vol. 62, 32-33, 1943.

EDITORIALS

LAURENCE V. BURTON, Editor

OPA and "Processed" Foods

OPA has replied to our October, 1943, page 54, editorial comment on Ration Order 13 in a letter to the editor published elsewhere in this issue.

The letter explains little, and does not justify the OPA position. Notice that the Director of Food Rationing carefully avoids referring to the food processing industry by calling it "the food producing industry." Yet the War Food Administration refers to food production when it means farming. So food production means processing in OPA and farming in WFA.

The right hand knoweth not what the left hand doeth. Ho, hum.

Opposing Subsidies

All the arguments for food subsidies arise from the administrative ineptitude of the New Deal and its lack of intellectual honesty. If Congress had the self-sacrifice, courage, determination and backbone of our military forces, it would clean up the administrative mess into which our civil affairs have fallen, it would smack down the pressure groups of which James F. Byrnes has recently complained, it would either repeal the Wagner Law or forbid strikes during the war, it would repeal the remnants of the Agricultural Adjustment Act which determines minimum prices on a fictitious basis, and it would insist on placing responsibility and authority where it belongs.

Food subsidies are nothing but one more gadget on our Rube Goldberg-like economic administration. Those who favor it are either too close to the job to get a proper perspective, are too dumb to understand the current administrative fiasco, or are too timid to tell the people the truth, the whole truth and nothing but the truth.

It is discouraging to find that business men like Chester Bowles of OPA argue for the subsidy and do not explain that unless this is paid the effect of another law—AAA (which Congress should repeal)—will automatically put prices up by the amounts he tells. Maybe businessmen in government take the President's anti-criticism order too seriously. A William Jeffers is needed for food as much as for rubber!

War's End and Business

When will the German war end? That is the most common question of the day. One can understand why some two- and three-star generals are betting with each other. But why should the general manager of one of this country's largest retail stores journey a thousand miles to ask us, among others, what is our best guess? As he explained his position:

"Any business executive must take a definite stand on the war's end whether he does it consciously or unconsciously. If he takes no stand at all, he unconsciously places the war's end at some rather remote date.

"We believe that the control of our business will be more successful if we take a definite position, even though we miss the date by months, than if we assume that war will go on continuously to some indefinite date."

With those remarks he requested each one present to write his guess as to the end of the war with Germany. The average of 16 dates was about March 1. This department voted for June 1, which, after the Teheran conference, seems too early. Also, we stated that no guess could be made with respect to the Japanese war until the Japanese navy had been sunk or captured.

Paper Problems Are Your Problems

Paper not only must be salvaged at every possible turn, it must also be conserved.

Shortage of manpower in the forests where pulp wood is cut has reduced paper production to the danger point. Everybody must conserve paper. Use as little as possible. Then see that as much as possible of the used paper gets back into use again by salvage operations.

Paper packages going to the war fronts never come back for remanufacture as does scrap iron and steel, known as "battle scrap." The tonnage of paper going overseas is huge, and the armed forces must get theirs regardless of the shortages on the home front.

Salvage and conservation must be the rule at home.

Maybe This Will Help

A man who is wise in the ways of this wicked world has assured us that the surest way to get a slow decision or no decision at all from OPA is to address the inquiry to an individual. He says that all inquiries should be addressed to OPA and not to an individual—that no individual should be mentioned even if you have had many conferences with someone on your problem. The reason he gives is that no man in OPA will stick his neck out if there is any evidence, such as his name, that he has been approached previously.

There is only his word that it works, but he says this procedure will get prompt results after weeks of waiting.

Understanding the Fat Shortage

The current wartime fat shortage is a matter that requires some explanations in order to understand it fully. If edible fats are considered alone there is relatively little shortage. Some informed persons even believe there is more than enough for all edible needs.

Primarily, the fat shortage exists in the inedible fats, and hence the need for the household fat-salvage campaign which is not going so well. To make up for the deficiency of inedible fats for making soap and glycerine, the current practice has been to divert some of the edible fats, notably lard, to this inedible-fat purpose. And, of course, this results in less lard for eating purposes.

Back of the whole shortage in the fat situation is the loss of annual imports of about a billion pounds of coconut oil as a result of Japanese military action.

Household fat salvage must be increased materially if the situation is to be alleviated. OPA's decision to give two red points per pound of fat turned in is a move in the right direction. It

ought to produce larger results than doubling the money value of salvaged fat, for points are scarcer than money today.

Fat salvage is everybody's job. Keep it up!

Net Weight Troubles Of Flour Millers

Flour is a hygroscopic food that has the peculiar property of giving off moisture or taking it up, depending on the relative humidity of the atmosphere in which it is stored. This property has given rise to a number of minor vexations to flour millers who sell flour packaged for the family trade which, of course, must bear the statement of net weight of contents. The difficulty arises because, unless the packaged flour has been kept continuously in an atmosphere with which its own moisture content is in equilibrium, the flour is bound to gain or lose weight in the course of time. The only way to prevent such loss or gain of moisture is by methods that are wholly impractical as well as unnecessary—air conditioned transport and storage, or packaging in moisture-vapor-tight containers.

Although Federal standards permit 15 percent moisture content, flour in the United States is usually packed with an original 13.5 to 14 percent moisture content and, although the slight variations of moisture content that occur do not in any way alter the content of dry substance in a flour package, the matter is not an academic problem. Food inspectors and food control officials are regularly pouncing on flour packages that may have lost some of the original moisture. The product is then libeled with a charge of a shortage of net contents when, as a matter of fact, storage in a higher relative humidity would restore the lost moisture.

The situation calls for study and understanding on the part of food inspectors, particularly those employed by states and municipalities. Those to whom the subject is important should also study the complete and scholarly paper by Anker, Geddes and Bailey of the Minnesota Agricultural Experiment Station, published in *Cereal Chemistry*, vol. 19, page 128, January, 1942.

This study shows that flour can gain almost 2 percent or lose more than 3 percent of moisture, depending on whether it is stored in damp or dry air. Even the empty sacks will gain or lose weight under these conditions.

No seizures for shortage of net contents should ever be made without first making moisture determinations and calculating the flour content back to a standard moisture content such as 13.5 percent.

Our Changed Format

You will notice a few changes in the location of certain matter in FOOD INDUSTRIES beginning with this volume. The general editorials will be found further back in each issue.

News is being treated slightly differently to facilitate rapid reading.

We hope you like the changes, but if you don't please tell us how you want it, and why.

Taking Bread out of The Balloon Factory

In an address given some months ago at the American Society of Bakery Engineers is this commendable paragraph:

"Present conditions and formulas are conducive to the production of good bread. Let us make the most of it—no longer are we plagued for that extreme volume and extreme softness. It is therefore our chance to take bread out of the balloon factory, out of the cotton factory—yes, even out of the beauty parlor—and into the bakery to make *just* good bread."

This advice is very sound, and is in line with the needs of the future.

Competition often leads to absurdities in products. Consider the situation that existed 25 years ago in the soap industry, where the effort was to produce the biggest bar of soap for a nickel. A smart man connected with a now defunct soap maker used to plead with his board of directors to go back to selling soap, not size or price. His argument was that someday somebody would start selling *soap*, and that it would be just too bad for the others. That somebody proved to be Lever Bros., who came out with "Lux," an all-soap product that took the leading place and has been a household word ever since.

History has a habit of repeating, largely, one suspects, because human nature does not change and because men make history rather than *vice versa*. Think it over.

The Full Story of a Food Law Violation

Despite the extreme reluctance of most food manufacturers to tell us of the facts preceding a seizure under the Food, Drug and Cosmetic Act, in one case we have been successful in obtaining what we believe is the whole story. Though the tale is not spectacular, it is related because the manufacturer was persuaded to do an act against his better judgment.

This incident was misbranding of canned peas. The product was, in the judgment of the producer, of substandard quality and should have carried a substandard label. But a broker persuaded the canner that it was a borderline case where anyone who really knew his quality grades would place the quality grade as a low standard but never as a substandard. With many misgivings the canner finally consented to the sale as a standard grade of quality with the firm's regular labels on the package. Most of the goods had gone into consumption before the government seized the remaining remnant. The canner allowed the case to go by default, swore roundly at the broker, and vowed to deduct an appropriate amount from his next commission.

Aftermath: The same distributor wanted more of the same peas under the same label at the same price with a guarantee that the goods were really standard quality. He would not have them under the proper substandard label at any price.

Which goes to show that food violations are not always the fault of the manufacturer, though they are always his misfortune.

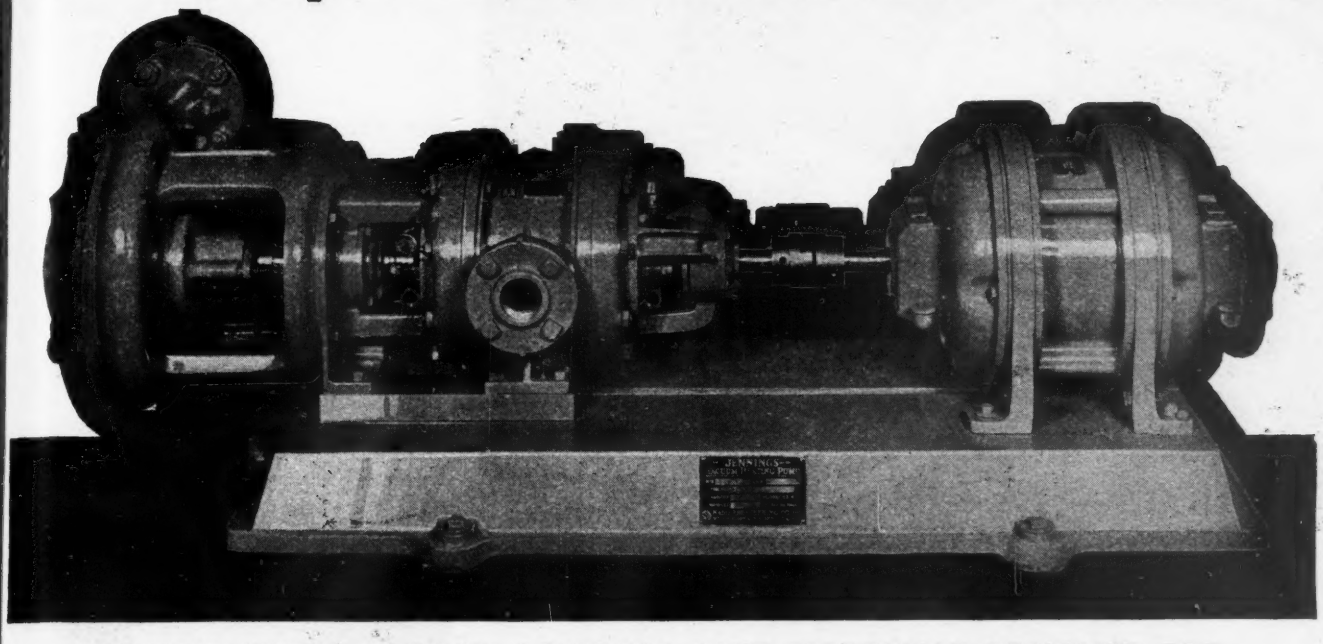
Truck Tire Outlook Bad

Synthetic rubber tires on heavily loaded, fast commercial trucks heat up and stretch. This leads to carcass failures. The only remedy is generous admixture of the very scarce crude natural rubber until some way is discovered to make synthetic do the whole job satisfactorily.

According to Joseph B. Eastman, the truck tire situation will be so bad by mid-1944 that commercial vehicles will have to use all-synthetic tires and, worse yet, operate at low speeds with *no overloading!*

This unhappy outlook calls for study now for it will have definite repercussions in the distribution of foods.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

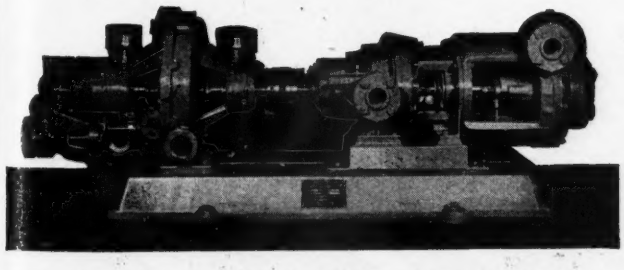


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.

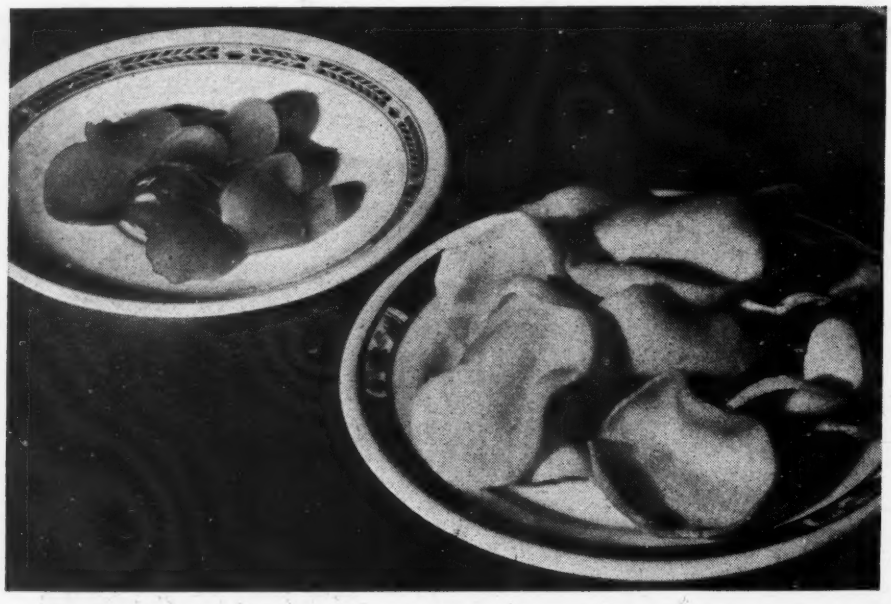


THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK · CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS



Cheese Tidbit

"CHEESE KRACKETTS," to be served with salads, drinks and sandwiches in place of potato chips, have been introduced by F. Guntrath-Lorenzen, Chicago, Ill.

Made from cheese, tapioca, corn and potato starches, salt and U. S. certified artificial coloring, the Kracketts must be deep fat fried in vegetable oil at 400 deg. F. for five seconds and salted to taste. Before frying, the chips are amber colored, smooth to touch and very brittle. When ready to eat, the finished product has puffed up to approximately triple its original size, is light in color and porous in structure. The chips before and after cooking are shown above.

Cheese Kracketts are packaged in a double cellophane bag, closed by folding.

Soya Spread

DISTRIBUTED solely for the Canadian market, "Soyhart" Soya Spread has been put out by J. L. Trumbull, Ltd., Vancouver, B. C. Covered by Canadian process patent No. 495,347, it is a highly nutritious soya product manufactured not as a substitute for peanut butter, but as a product in itself to give the consumer the outstanding food value found in the soybean.

Made from toasted soya flour, refined edible oils and salt, Soyhart has a rich nut-like flavor. It resembles peanut butter in appearance but is more finely ground in texture and much more fluid. It is packed in 9-, 16- and 24-oz. glass jars which have metal screw-caps with impregnated chipboard liners.

Analysis of the spread shows that there are 42.80 percent fat, 26.71 percent protein, 12,800 International Units per 100 grams of vitamin a, 61.7 micrograms per gram of nicotinc acid and 1.27 micrograms per gram of riboflavin.

Tomato Crackers

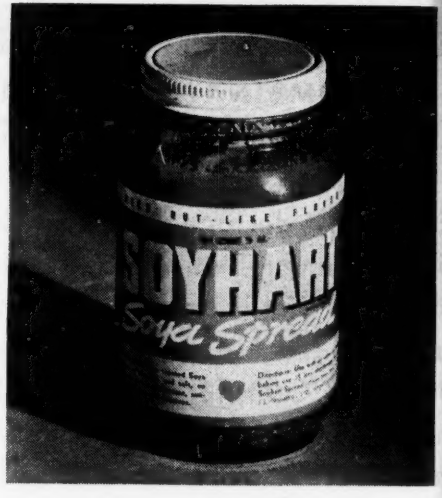
AN unusual source of vitamin C has been made available in the form of Ivin's "Tomato Chips," cocktail size, manufactured by J. S. Ivin's Sons, Inc., Philadelphia, Pa. Made from wheat flour, puree of tomatoes, shortening, sugar, salt, spices, malt and leavening, the crackers have a nicely toasted yellow appearance, are sprinkled with salt, are hexagon in shape and have a predominant taste of tomatoes.

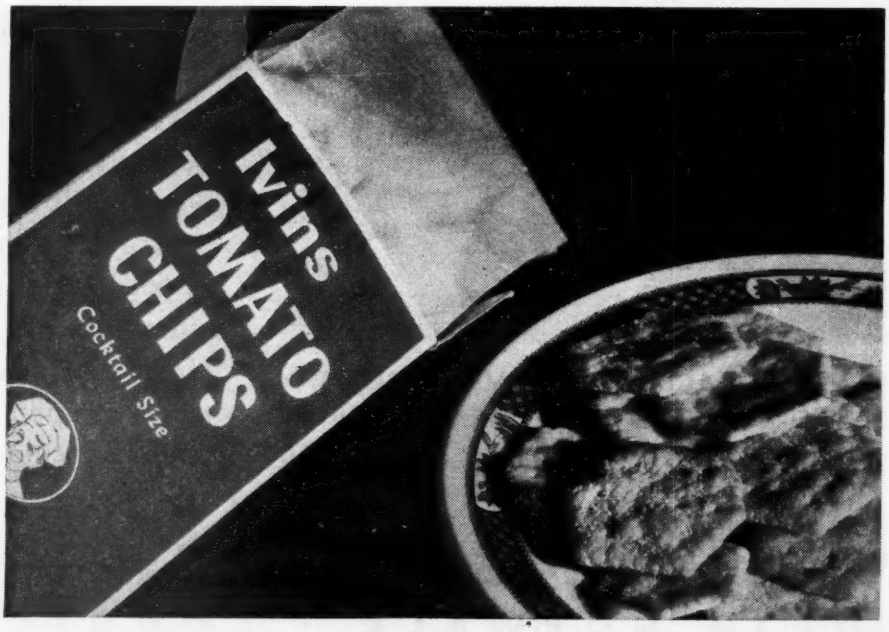
The crackers are packed in a waxed paper bag inside a 4-oz. chipboard green and white container. They are suitable for parties and as a convenient appetizing snack between meals.

Raspberry Honey

No points are required for the Pure Raspberry Flavored Honey, processed by Tavern Fruit Juice Co., Brooklyn, N. Y. Nationally distributed, it contains Cuban honey flavored with concentrated raspberry juices, and is put up in 1- and 2-lb. glass containers with metal screw caps which have Vinylite liners.

No preservatives are added to the honey, and it is used as you would use honey. It can be poured over ice cream, puddings, cereals or grapefruit; mixed with milk to give it a better flavor; or used as a healthful spread for bread.





ADE WITH WATCHMAKER'S CARE

Yes THERE'S A DIFFERENCE IN GLASS

MOST people regard a watch as just about the last word in skillful, precise workmanship. But what surprises many—even those familiar with glass—is to learn that the glassmaker is a precision worker, too. He uses the same care as the watchmaker in keeping his product within required limits of measurement.

In the manufacture of side-seal finish jars, for example, the accuracy of Armstrong's moldmakers is just as important, tolerance-wise, as in the making of a fine watch. For this type of finish demands finest workmanship if it is to be sealed adequately.

Most glass craftsmen take a watchmaker's pride in meeting tolerance requirements—a difficult thing to do when materials are worked at high temperatures, where even the *slightest* temperature change can make a tremendous difference. And Armstrong strives for an especially high degree of exactness in such details as the finish, because accuracy here helps to assure a tight seal. Accuracy is just one of the many qualities of fine glassware. Others include thermal shock resistance, distribution, degree of brilliance, clarity, and so on.

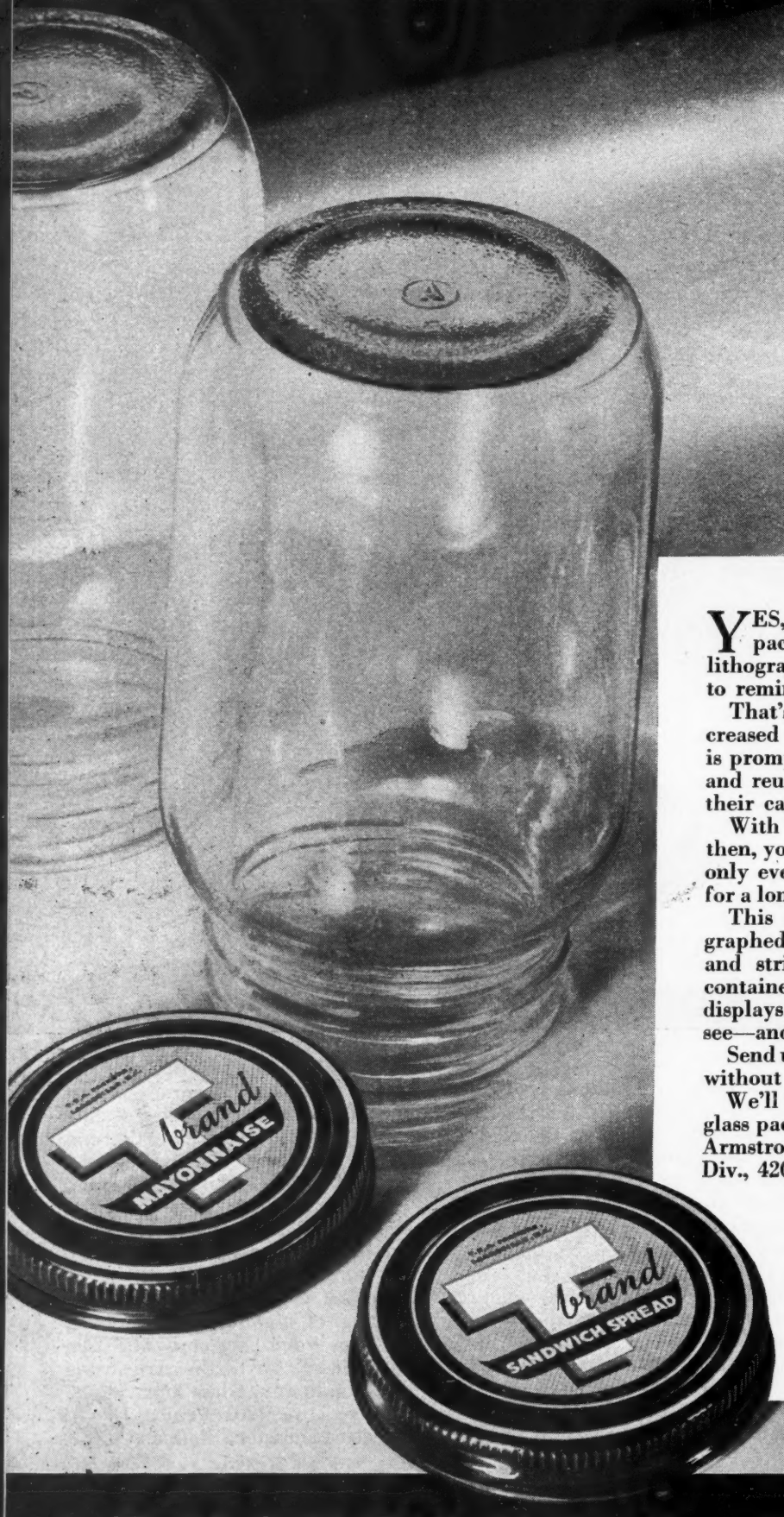
Added together, these qualities make a big difference in the ware you buy. That's why we say, "There *is* a difference in glass."

For a complete story of the making of top-quality glassware, send for your free copy of "Men and Glass." Write the Armstrong Cork Company, Glass and Closure Div., 4201 Prince Street, Lancaster, Penna.

ARMSTRONG'S GLASS

and ARMSTRONG'S CLOSURES

STILL SELLING YOUR PRODUCT...



YES, even after the contents of your glass packages (and the labels too) are gone, lithographed Armstrong's Metal Caps continue to remind housewives of your brand name.

That's especially important today. For the increased emphasis on wartime food conservation is prompting more and more housewives to save and reuse your jars. Thousands more jars—and their caps—are "seeing extra service" this way.

With lithographed Armstrong's Metal Caps, then, your trade name or brand is on display not only every time your product itself is used, but for a long time afterwards.

This is only part of the selling job lithographed caps do for you. Their bright colors and striking designs make standardized glass containers stand out on store shelves and in mass displays. They make it easier for customers to see—and buy—your products.

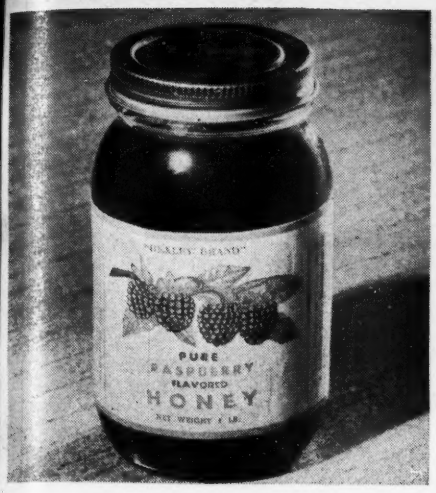
Send us your present packages and we'll return, without obligation, sales-building cap designs.

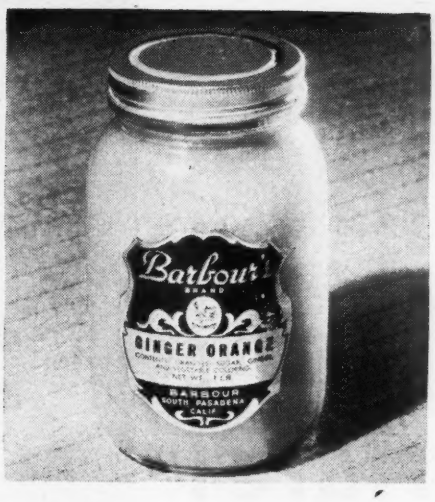
We'll be glad to help, also, with any other glass packaging problems you may have. Armstrong Cork Co., Glass and Closure Div., 4201 Prince St., Lancaster, Penna.

The Army-Navy "E" and Star have been awarded to the men and women of Armstrong's Closure and Floor Division Plants for excellence in the production of such war materials as cartridge cases, shells, bombs, and aircraft sub-assemblies.

ARMSTRONG'S CLOSURES

Turn standard containers into standout packages





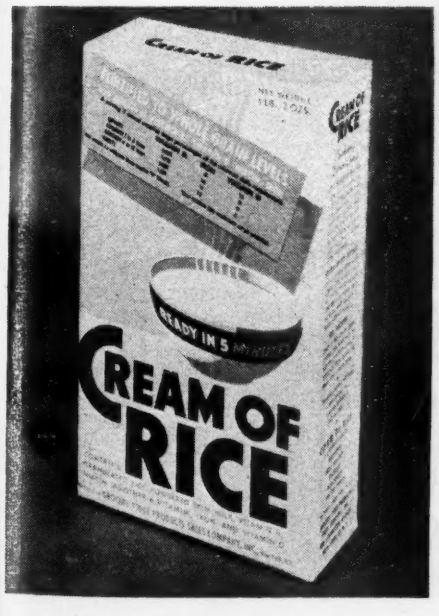
Maple-flavored and strawberry-flavored honey, two other flavors manufactured by Tavern Fruit Juice, are also packed in 1- and 2-lb. glass jars.

New Cereal Package

Grocery Store Product Sales Co., Inc., New York, N. Y., not only has completely redesigned its "Cream of Rice" package but has fortified the product to whole-grain levels to keep in step with the nation-wide trend in fortifying cereals.

The front of the package highlights in a red panel data on the vitamin content of Cream of Rice and also brings out the quick-cooking feature with the phrase "Ready in 5 minutes." The back of the new package makes the claim, "We believe you'll like it even better than wheat," illustrates five new advantages and makes six suggestions on how to serve Cream of Rice.

Vitamin B_1, vitamin G, niacin and iron have been added to the product to bring it up to whole-grain levels for these vitamins and minerals.



Fruit Relish

"Ginger Orange," recently developed by Barbour, South Pasadena, Calif., is a coarsely ground combination of oranges and ginger, sugar and vegetable coloring. The fruit relish is packed in 1-lb. glass jars with a metal screw-cap that has a latex sealing ring, and is intended to be used with meat and poultry dishes.

Herb Flavored Mustard

As an addition to its list of herb-flavored products, House of Herbs, Inc., Canaan, Conn., has put up a new product, Herb Flavored Mustard Sauce. Sold with the company's other products in a group

package rather than as a single item, the mustard sauce adds a flavor to canapes, cold and hot meats, cheese dishes or salad dressings.

When mixed with mayonnaise, one part of sauce is used to three or four parts of dressing. For broiled fish, steaks and other meats, a level tablespoonful to one-half cup of melted butter gives an epicurean touch.

The ingredients are prepared mustard, seven fresh herbs, broth, brandy, seasoning and spices. The product is packaged in 5-oz. glass jars with metal screw-caps with resin-coated liners.

LOOKING AHEAD...

No merchandiser is fooled by the ease with which his product sells nowadays. Abnormal conditions are always temporary. That tough Buyer's Market may be just around the corner.

Buying habits are being formed today as always. Mrs. Consumer, whether consciously or unconsciously, continues to make a bee-line for Quality—and Quality is unmistakably typified by a distinctive, appetite-whetting package.

The Rossotti organization offers you a completely integrated service on fine Labels, Package Wraps and Folding Cartons—from sketch to finished product. Complete Art, Idea, and Merchandising Counsel.

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FOOD INDUSTRY NEWS

THE PROCESSING PICTURE

Subsidy Delay Postpones Processors' Conference

Failure of Congress to complete action on subsidy controversy holds up OPA, WFA pricing plans

INDEFINITE postponement of the food processors' war conference, which originally had been set for the week of January 9, in Chicago, has been ordered by the administrative council of the National Canners Association. Postponement was ordered when it became apparent that Congress would not complete legislative action on the subsidy controversy in time to permit OPA and WFA to complete 1944 pricing plans so that they can be conveyed to canners, freezers, dehydrators, preservers and other food processors during the week of January 9. The new date for the conference now hinges on the question of when Capitol Hill and the White House will settle the fate of food subsidies for 1944.

The logic of postponing the conference was dictated by what happened at the December, 1942, meeting when NCA and other food processing trade associations herded their members into Chicago to get specific instructions on the 1943 pack. Instead of detailed plans, the processors heard only general platitudes from government officials who engaged in a game of buck-passing. Actually, processed food pricing regulations were not completed until late in the summer of 1943.

However, with former canner Carl Lovegren heading OPA's canned fruit and vegetable program and with the general influx of businessmen into OPA's food division, there is general agreement in OPA and WFA that definite plans for 1944 must be made available much earlier than in 1943. Even the delay made necessary by the failure of Congress and the White House to decide the fate of subsidies before the first of the year has resulted in fears among officials as well as industry quarters over the possibility of meeting government pack goals working under the handicap of a late start.

These fears are enhanced by the resolution passed by Congress to delay final settlement of the subsidy issue until February by voting a resolution continuing the status quo two months. Because current 1944 pricing plans definitely include at least subsidization of processed food raw materials, with the possibility that certain labor costs also will be subsidized, both industry and government sources are in agreement that it would be a waste of time to hold the processors' conference until the subsidy controversy is settled. If Congress is successful in killing subsidies even after a presidential veto, OPA and WFA would have to revamp their current pricing plans.

With raw materials and finished product prices, raw material and labor cost subsidies and price supports to prevent a postwar market collapse uppermost in the minds of all food processors, government men recognize that it would be futile to hold a conference merely to tell the industry the 1944 desired goals. It is generally recognized in Washington that food processor morale is low as a result of sloppy handling of the 1943 program, and that only early announcement of detailed plans—with definite and irrevocable commitments—will produce the desired 1944 processed food goals.

Aside from the basic question of the role that subsidies will play in the 1944 processed foods program, there is the specific issue of whether foods will be priced on the basis of flat dollars-and-cents ceilings tied to regions and government grades similar to the plan used in 1943 or whether the government will revert to the formula pricing plan used in 1942.

Advocates of formula pricing, which include the distributors of nationally advertised brands, have the support of Mr. Lovegren and his OPA aides, and it was originally thought that they would be able to push their plan through. However, price administrator Chester Bowles told a recent press conference that "we will have dollars-and-cents prices on food as long as I am here—I will never retreat on it."

Congress Uncertain On Food Subsidies

THE Senate's decision to give Congressmen 60 days to mull over the subsidy issue before bringing it to a final vote greatly increased the chances of an eventual compromise satisfactory to the Administration, even though Food Administrator Marvin Jones may be somewhat miffed. Jones has been calling for quick action, claiming that dilly-dallying over subsidies is holding up the whole 1944 food program.

The Senate's last-minute retreat

British Combine

FOOD FOR THE LIBERATED

Chocolate with vitamins added has been specifically requisitioned by the Ministry of Food from Messrs. Cadbury Bros., Ltd., and other British chocolate manufacturers for the starving peoples of Europe when they are liberated. This will help to make up their food deficiencies and restore their health and strength quickly. In addition to being a rich food in itself, chocolate is a good carrier for added enrichment. The picture shows a wide belt conveyor transporting blocks of enriched chocolate into the wrapping department at Cadbury Bros.

wasn't prompted by any change of heart on subsidies—most Congressmen like them no better than they ever did. But with legislation designed to increase oil prices and railroad workers' wages coming to a head along with subsidies, Congressmen are getting cold feet for this reason: Individually, the Administration's arguments on these three issues —subsidies, rail wages, and oil prices —may not be very potent. But collectively they prove the President's point—that the whole stabilization program is in danger. Few Congressmen are willing to take the responsibility for smashing it.

When Congress adjourned on December 21, the subsidy program was left in status quo, with a deadline set at February 17 for a further extension or a resolving of the differences which made Congressional agreement on the issue impossible before Christmas.

Frozen Ground Meat Should Not Be Salted

WHEN pork sausage is to be quick frozen and held in freezing storage, salt should be omitted from the seasoning mixture. This is the advice of chemists at New York State Agricultural Experiment Station, Geneva. And the same precaution is advised in freezing ground beef. Other seasoning materials, however, such as sage, pepper, mace and ginger, seem to have a beneficial effect.

Salt promotes oxidation in ground meats, resulting in rancidity. The changes may be caused by the salt stimulating the fat-splitting enzymes or by direct chemical action on the fat itself. Pepper, sage, mace, and ginger, on the other hand, have the opposite effect on the fat during freezing storage and seem to retard rancidity.

Cost of Dehydration Process Is Reduced

RAW GROUND BEEF, so light in weight that it might be called "V-mail hamburger," has been prepared and canned by F. J. Stokes Machine Co., Philadelphia, to show what can be done with the process of dehydrating food from the frozen state under a high vacuum. Processed by this method, the beef retains its natural taste, flavor and other properties to an extent that has not been attained by other methods.

It is significant that in four years of development, the cost of this dehydration method has been reduced until it may be within the reach of food processors. By the development of new and more efficient types of high vacuum pumps and gages and equipment essential to this method, the price of the equipment necessary to desiccate 100 liters of blood plasma per week has been reduced from $20,000 to $5,000.

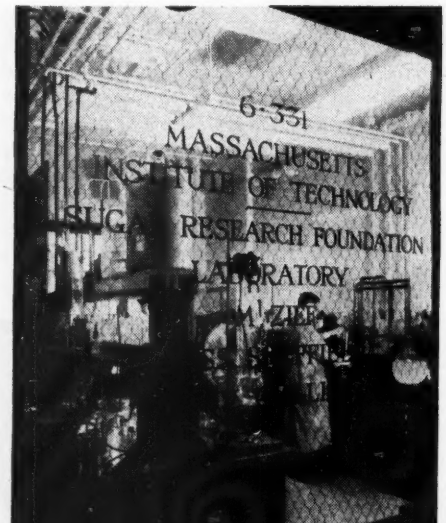
Application of the method has not been limited to meat. The Stokes pilot plant has produced dehydrated peas, carrots, string beans, lima beans, beets, coffee, cranberries and many other foods.

Limited supplies of orange juice are now being prepared by this method for the Army Quartermaster. And it is expected that the first plant for producing orange juice in substantial quantities will be erected in Florida in time to handle some of the present crop.

Millard Succeeds Marshall

HAVING SERVED as acting director of the Office of Materials and Facilities of the War Food Administration since the resignation of M. Lee Marshall, J. W. Millard has been appointed director of the office. He is now in charge of WFA programs relating to supplies machinery, equipment, materials and facilities used in producing and processing food.

Mr. Millard before the war was associated with advertising agencies in New York. In January, 1942, he joined the staff of WPB and worked with the requirements committee that developed into the WPB Program Bureau.



TO STUDY SUGAR

Sugar is so commonplace that most people think they know all about it. But food technologists realize there is much to be learned, because sugar is one of the least understood scientifically of all the products of nature. So a long-range sugar research program will be undertaken at Massachusetts Institute of Technology in cooperation with the newly established Sugar Research Foundation of New York. This research is expected to lead to new and important uses for both sugar and its relatives of the carbohydrate family. The sugar laboratory at MIT is shown above.

Bottlers Have Many Problems

Manpower, containers, equipment, supplies and reconversion discussed at meeting

HOW TO MEET the demand for soft drinks by the armed forces and civilian war workers in the face of wartime restrictions and shortages dominated the recent silver anniversary meeting, in St. Louis, of American Bottlers of Carbonated Beverages.

In the interest of clearing up troublesome questions and exchanging helpful ideas, a portion of each day was devoted to forum and panel discussions on supply and ingredient problems. So timely was the program that the surprising number of 1,488 was in attendance in comparison with 1,239 at the 1942 wartime conference in Chicago.

Of most concern were the shortages and curtailments in manpower, closures and containers. Vigorous protest was voiced against the nondeferrable classification of the soft drink industry with respect to key personnel.

Relief from the 80 percent sugar restrictions by the 10 percent increase for November and December, and by a possible 100 percent of 1941 usage for 1944, was more than offset by the announcement of continued, and possibly increased, restrictions on closures and containers.

Steel for closures and strapping shows no indication of an increase. No prime steel is to be available for 1944, and closures made from black steel rejected by can makers is limited to 70 percent of 1941 usage. The glass container supply for 1944 was given as 65 percent and paperboard for cartons as 80 percent of purchases during a corresponding period in 1942. At the present rate of demand, truck tire needs are 200,000 to 250,000 per month greater than production, which means no potential easing in tire restrictions.

Citric acid supplies for 1944 are to be increased from 45 to 60 percent of 1941 usage and ginger supplies from 75 to 100 percent of 1941 usage. This is encouraging only as repair parts for bottling equipment and bottling supplies become available. It was announced that WPB plans to make available repair parts, and also new equipment to meet such unforeseen emergencies as destruction or damage by fire, floods and the like.

In reconversion of the industry to postwar conditions, no special problems of production curtailment is faced. Ever since the outbreak of war, the industry has been operating at considerably less than capacity. The factors of most concern are the shifting of civilian work-

rs, disbanding of war workers, and discharging and shifting of armed forces. The officers of ABCB were reelected. They are: president, John F. Leary, C. Leary & Co., Newburyport, Mass.; vice-president, J. W. Milner, Gulfport Coca-Cola Bottling Co., Gulfport, Miss.: treasurer, Joseph La Pides, Pepsi-Cola Bottling Co., Baltimore, Md.

Enameled Cans Best For Packing Pilchards

RECENT TESTS indicate that No. 1 oval cans manufactured from 1.25 hot-dipped plate are not satisfactory for use in packing pilchards in tomato sauce for the War Food Administration unless the cans are inside-enameled. And WFA has requested that the packers use inside-enameled can bodies on all deliveries of canned pilchards to Federal Surplus Commodities Corp. as soon as such cans can be secured. The FSCC is to reimburse the packer for the difference between the cost of plain oval can bodies and inside-enameled can bodies.

Technic Developed For Amino Acid Assay

TECHNOLOGISTS have come to recognize amino acids as important nutritional factors. This has introduced the problem of making exact assays, comparable to those applied to vitamins and other such substances. To meet this need, a rapid and practical technic of assay has recently been worked out after long research work at the laboratories of the Wm. T. Thompson Co., Los Angeles. This company reports that it is now in a position to supply microbiological assays of the following amino acids: Glutamic acid, leucine, valine, tryptophane, crystine, threonine, isoleucine, methionine, tyrosine, serine, phenylalanine and arginine.

Food Plant Wastes Used to Clean Metal

A NEW OUTLET for the waste materials from certain types of food processing apparently has been developed. It has been discovered at the Northern Regional Research Laboratory, Peoria, Ill., that ground corncobs, peanut shells, and similar waste agricultural materials are useful for cleaning machine parts. When ground to pass a 16 mesh screen and used in ordinary sand-blasting guns with openings of $\frac{3}{16}$ in., these materials remove organic and softer mineral deposits from metal parts without any appreciable wear on the metal surface. Ground rice hulls clean more rapidly than the other materials, but are slightly abrasive to steel because of their high silica content. But since the different types of wastes vary widely in silica content and hardness, it is possible to adjust their abrasive and cleaning properties to the metals to be cleaned and the deposits to be removed.

HEADS BAKING INSTITUTE

Louis E. Caster, president of Keig-Stevens Baking Co., Rockford, Ill., has been elected president of American Institute of Baking. Ralph D. Ward was reelected chairman and Milton Petersen is the new vice-chairman. M. Lee Marshall was reelected treasurer.

Action on Standards Delayed by Quibbling

STANDARDS for enriched farina, in preparation by the Food and Drug Administration, have been awaited many months. They are held up by internal discussions between F&DA and its superior agency, the Federal Security Agency. At least a substantial part of the delay appears to lie in a fundamental difference of opinion between the two agencies.

The experts and attorneys of F&DA have done what they consider a workmanlike job. They believe that there is a sufficient record to support each finding of fact and each detail of the revised standard proposed. Apparently, the attorneys of FSA do not agree. They seem to recognize the weakness of certain parts of the standard because of the difference of opinion expressed by specialists who testified at the hearings.

A very much longer delay is expected in the issuance of revised standards for enriched flour. It is now expected that some time during January or February there will be a new notice of hearing on that subject. The supplemental hearing will deal principally with the rules under which millers are to be permitted to add soya flour or other high-protein components. The result is likely to be at least another six-month delay.

Army Rules on Renegotiation

Quartermaster General exempts many food items purchased by the armed forces

EXEMPTION from renegotiation of a long list of food items purchased by the armed forces has been ordered by Quartermaster General E. B. Gregory. In this action, the Quartermaster General took the lead while legislation specifically exempting agricultural products from renegotiation awaits final Congressional action in the Senate. The action was taken on the basis that the profits under contracts and subcontracts for the purchase of the specified foods can be determined with "reasonable certainty" when the contract price is established.

The following is the list of foods the contracts and subcontracts for the purchase of which have been exempted from renegotiation:

Fresh fruits: Apples, apricots, bananas, berries (blue and black), cantaloupes, cherries, cranberries, grapes, grapefruit, honeydew melons, lemons, limes, oranges, pears, peaches, plums, strawberries, tangerines, watermelons, other miscellaneous fresh fruits.

Fresh vegetables: Asparagus, lima beans, string beans, beets, broccoli, cauliflower, corn, cucumbers, egg plant, endive (chicory), greens (collards, etc.), kale, lettuce, green onions, dry onions, parsley, parsnips, peas, green peppers, Irish potatoes, sweet potatoes, radishes, spinach, squash, tomatoes, turnips and rutabagas, mushrooms, rhubarb, other miscellaneous fresh vegetables.

Dairy products: Butter (except canned), cheese (except processed canned), ice cream, fresh fluid milk, fresh fluid cream.

Poultry: Chicken (except canned), turkey (except canned), other poultry (except canned).

Meats: Beef (except canned and dehydrated), pork (except canned and dehydrated), lamb and mutton (except canned and dehydrated), veal (except canned and dehydrated), smoked or processed meats (except canned and dehydrated), other meats (except canned and dehydrated), lard and lard substitutes, offals (except canned and dehydrated).

Fish and seafoods: Fresh or frozen, salted or smoked (except canned).

Frozen vegetables and fruits.

To Dehydrate Cooked Fish

PROCESSORS in British Columbia are going into the commercial dehydration of cooked fish. This follows the announcement by research technologists at the experimental fishery station in Vancouver that a workable method of dehydrating fish had been developed.

The fish will be marketed in Washington, New York and eastern Canada. The products to be offered include salmon steak, herring, halibut, clams, skate and other types of fish. By the dehydration process, 1,000 tons of fresh fish is reduced to 130 tons of solids, and the product can be shipped in ordinary boxcars or carried in ordinary shipholds without refrigeration.

Committee Condemns Mandatory Grading

No EVIDENCE that mandatory grade labeling of processed foods would further the war effort or be in the public interest has been presented before the Special Subcommittee on Investigation of Restrictions on Brand Names and Newsprint of the House Committee on Interstate and Foreign Commerce. This is number one in the conclusions contained in an interim report of the subcommittee.

It has been clearly demonstrated in the hearings, the report states, that the enforcement of mandatory grade labeling or the required use of government grading would constitute a far-reaching change in our methods of food processing and distribution. And such changes are authorized under the Emergency Price Control Act of 1942, without specific mandate by Congress, only where it can be demonstrated that they are necessary for the prosecution of the war or that without them the effective enforcement of price ceilings would be impossible.

The committee concludes that none of these conditions applies in the case of Federal grade labeling or the use of Federal grades in pricing.

In substantiating its conclusions, the committee said that according to the testimony the current wide use of nationally advertised food brand names offers a far more effective protection of food quality than a system of mandatory grade labeling. Another factor brought out in the testimony is that mandatory grade labeling would foster a tendency to lower the general average quality of the merchandise packed, as many packers probably would be forced to pack down to the grade level rather than to pack a product of higher quality.

While the hearings of the subcommittee were to be continued, such a convincing case against mandatory Federal grading and grade labeling had been made that government agencies were strongly urged to refrain from any further experimentation in this field until the subcommittee submits its final report and recommendations.

Confectioners Study Public

WHAT the public thinks about the production and marketing of confections will soon be known by the confectionery industry. A special fact-finding study is now being made among different age and income groups, and a special investigation will be conducted among professional people such as doctors, dentists, nurses, dietitians and teachers. The character and scope of future educational activities of the industry will be charted by the findings, according to National Confectioners' Association.

PLENTY OF DEMAND

Here is evidence of a keen demand in England for two foods produced in the United States—oranges and nuts—a demand that is not based merely upon wartime conditions. As in America, the children in Britain have a weakness for these delicacies. These are boys and girls from Peckham Central School clamoring for oranges and mixed nuts brought in by the crew of a ship which had been "adopted" by the children.

UNRRA To Build Food Stockpiles

Huge supplies will be built up so that food will be available to meet sudden needs

MAJOR policy plans of UNRRA were revealed to Congress in December when Director-General Lehman appeared to describe the policies of the agency for which he is now the executive officer. The primary purpose of his appearance before the House Committee was to support H. J. Res. 192, which is proposed legislation authorizing the United States to participate in the work of UNRRA.

The outstanding policy statement in relation to food was the program for building huge stock piles from which food can be taken in case of need. Such stocks will be used for countries which have no funds to buy or no facilities for purchasing, and they will be used as reserves to be allocated to other countries which may suddenly need great quantities of food when their nationals are liberated from Nazi control. In the first case, the funds of UNRRA will pay the bill, which means that Uncle Sam will be partly responsible. In the latter circumstance, the user country will reimburse UNRRA when it has the means for doing so.

Already this organization recognizes that sudden military shifts often create huge new relief burdens which could not be met by purchasing currently. These are the contingencies against the impact of which a stockpile must provide a suitable cushion.

It is definitely stated by Director-General Lehman that UNRRA is not going to assume any relief burdens except temporarily. The primary principle is that "UNRRA must at all times help others to help themselves." It is now frankly stated in Washington that the plan contemplated, so far as Uncle Sam participates, must be to tide over and not to pauperize nations in difficulty. Such results is expected to be much more acceptable in Congress, and the enactment of the needed legislation is anticipated. Thereafter appropriations will come along without difficulty, observers believe.

Cooperatives Increase

DESPITE manpower and supply shortages, there has been a sharp increase in new food stores in the retail cooperative field since the United States entered the war, according to the Cooperative League of the U. S. A. Nearly 100 new grocery cooperatives have been opened from New York to California, the League reports.

CALIFORNIA COMPETITION

Florida's citrus fruit industry is out to get a bigger slice of the market for oranges, grapefruit and tangerines. The Florida Citrus Commission is sponsoring a million-dollar advertising campaign to tell the people the merits of the Florida products. Looking over the ammunition for the campaign are (left to right) Harvey A. Baum, general manager of the Atlantic Commission Co.; Spurgeon Tillman, New York division sales promotion representative of the Florida Citrus Commission; D. J. Kepner, vice-president of Benton & Bowles, Inc.; and Earl French, market promotion manager of Atlantic Commission.

Court Upholds OPA In Vitamin-Price Case

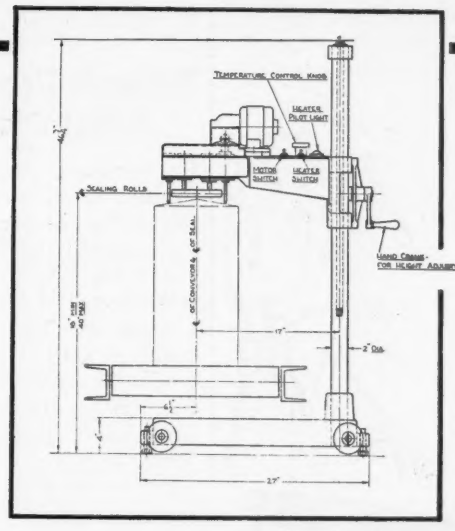
VITAMIN MANUFACTURERS have lost the first round in their battle with OPA to block a reduction in the ceiling price for their products—a battle in which a fundamental principle is at stake. The vitamin companies sought an injunction to resist an OPA price ruling which lowered the price ceiling for a product that has been reduced in price consistently both before and after price controls were established. But the U. S. District Court of the District of Columbia denied the application.

The end is not yet, however, for the plaintiffs are prepared to carry the fight through a long battle in the courts. The counsel plans an appeal in which it will argue that vitamin prices have declined, the potency of the product has been increased, production costs are higher, costly research has been necessary, OPA has ignored the facts and there is no inflationary threat to justify the OPA order.

Canned Foods Not Hurt Seriously by Freezing

THE ANSWER has been found to what happens when canned food freezes solid. This question became so important to the armed forces operating in cold climates that National Canners Association made an investigation. The find-

ATTENTION MAKERS OF DEHYDRATED FOODS



Power-driven, portable machine seals any Moisture- or Vapor-proof Bag

The packaging expert of one of the largest food concerns tells us that this machine appears to be just what the food industry is looking for... So we felt that we should let you know about it at once.

A number of these machines are now being built to seal moisture-proof bags containing oil pumps, fuel pumps, cylinder assemblies and other war materials. But since the machine is quickly adjustable for small as well as large size bags, and can be adapted to any heat-sealing moisture- or vapor-proof material, it can be used equally well for sealing bags containing dehydrated or other foods.

The machine is simply rolled under the standard gravity conveyor. As the filled bags are moved along the conveyor, the top edge of each bag is fed through the heat-sealing rollers. If desired, the bags may be sealed while in open containers. Perfect temperature control assures a firm seal without danger of overheating. Direction of rolls may be reversed by changing the motor leads.

The head on which the sealing unit is mounted can be quickly raised or lowered to accommodate the height of the bag. Maximum height of top edge of bag in sealing position is *41" from the floor*. Minimum is *19" from the floor*. Overhang of head allows sealing rollers to be centered over bags up to 30" maximum width. There is no limit to length of seal.

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Maple flavors are as numerous as trees in a maple grove, but MAPLE CONCRETE IMITATION M M & R is a stand-out for three important reasons:

1. Its fidelity of flavor is remarkable.

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ings indicate that nothing injurious is formed in canned foods when they freeze, and it may be safely asserted that nutrients are not affected. Not all canned foods were studied, but the general effects of freezing were determined.

Freezing solid does not strain the can or cause leakage or loss of vacuum. Some canned foods are not changed to any noticeable extent, but canned asparagus is seriously altered in physical textur Canned foods containing cooked starc such as cream style corn, thicken soups, potatoes, dry beans, and so fort are changed in physical form, but heating for serving the original cond tion is restored. Canned tomatoes a string beans are softened, and oth products may show adverse changes texture.

RAW MATERIALS REVIEW

Reports Progress in Plant Disease Control

ENCOURAGING progress is being made in the perfection of new chemical compounds for the control of plant diseases, according to Dr. W. H. Tisdale, director of Du Pont's pest control research laboratory at Wilmington, Del.

Soon after the war, Du Pont undertook research to develop better fungicides. The first products of this work were the organic mercurial seed and soil disinfectants, which are in extensive use. These, however, are not satisfactory for spraying and dusting growing plants for disease control. Continued search resulted in a series of organic chemicals of high fungicide value, these being the derivatives of dithiocarbamic acid. Among the pests controlled are certain insects, mites, coccidiosis of poultry and fungus diseases of plants.

1944 Sugar Prospects Are Linked With Feed

DEMANDS of the U. S. Government for alcohol production in 1944, and the raw materials from which the manufacture of this alcohol is permitted, seem likely to govern, to a considerable extent, the supplies of both sugar and feeds this year.

It will be recalled that, when sugar was scarce in the months just after Pearl Harbor, great pressure was exerted to switch alcohol production to grain as a raw material. More recently, with mounting livestock numbers and growing feed shortage, the pressure has been the other way, to shift some of the alcohol output back to sugar and save the "scarce" grain.

This whole situation has an unfortunate tendency to become a political football, kicked first this way and then that, by various pressure blocks. And what looks like a promising sugar situation for 1944 may well end up in tighter rationing.

1944 Sugar Supplies

Domestic production of cane and beet sugar in 1944 could well be the largest on record, as this year's crop goals call for full acreage of beets and increase plantings of cane. However, realizatio will likely depend more upon manpow than upon acreage. If the governme delays in the matter of providing lab to the same extent as it has already d layed in the matter of support price it is questionable whether either t cane or beet crops will come up to e pectations. Therefore, instead of coun ing on the 2,000,000 tons that shoul be grown at home, it is safer to assum that only 1,500,000 tons will be rea ized.

From offshore sources, raw sugar im port possibilities for 1944 includ around 3,600,000 tons from Cuba; 1 000,000 tons or more from Puerto Ric 800,000 tons from Hawaii, and misce laneous shipments from various Lati American countries.

In round numbers, this brings th prospective supply for the year, fro all sources, to some 7,000,000 tons sugar. And this still leaves Cuba molasses available for manufacture int alcohol, in a quantity equivalent to a additional million tons of sugar.

This supply, on the face of thing seems ample to provide for military an Lend-Lease requirements and still leav a balance for civilians sufficient to pe mit some increase in rationed amount However, just how far the supply wi go depends upon how much additiona sugar is diverted to alcohol manufacture.

Feed Supplies in 1944

The output of feedstuffs in the 194 1944 crop year is estimated to aggregat around 169,000,000 tons. This is al most a record amount, exceeded only b the 173,000,000-ton output of th 1942–1943 crop year.

In spite of the increase in number of livestock, feed supplies would see to be ample for all necessary purposes if distribution were normal. However an abnormal reationship between th price of corn and the price of hogs ha caused corn to be withheld from th dairy, beef cattle and poultry market for the future feeding of hogs. Thi has caused an apparent shortage.

It is this maldistribution of feedstuff that gives strength to the movement to switch alcohol manufacture from

ain back to sugar. How far this switch ill go, remains to be seen. Undoubtedly, some of the capacity will be witched. Whether or not this switch ill go far enough to cause a reduction rationed sugar quantities would seem depend upon decisions having little do with available supplies of either gar or feedstuffs.

GENERAL

Surplus of Labor Seen As Result of Cut-backs

UNEMPLOYMENT is forecast by officials the cut-back in war manufacturing ains momentum. A great many guesses e made as to the rate and the time at hich idleness may develop in certain eas. Not even the top military chiefs an guess accurately as to the rate of ut-back. But some Washington executives (who ought to know) say that here will be significant amounts of nemployment in certain parts of the ountry by spring.

The food industries will not share in he curtailment of manufacturing activity, except momentarily as they hange over from special manufacturng for the military to standard civilian oods. Even those shifts will come uch later than the cut-back in the anufacture of tanks, big land guns nd the other heavy equipment for land ighting which will be less needed in he Pacific than they have been in urope. The total curtailment of emloyment following a European collpse has been estimated at 5,000,000 actory workers. And within a few onths after the shooting war stops in urope, many military authorities feel hat 10,000,000 war workers and solliers can change to other employment. Many changes will, of course, be only within the factory where men are now mployed.

All of these factors are being discussed quietly about Washington. Officials do not wish to have such a prospect jeopardize the aggressive effort in hat part of war manufacturing which ust be continued so long as the Japs re at large in the Pacific area.

SCHEDULE OF EVENTS

JANUARY

10— United States Brewers' Association, annual meeting, Drake Hotel, Chicago, Ill.

11— Brewing Industry Foundation, seventh annual meeting, Drake Hotel, Chicago, Ill.

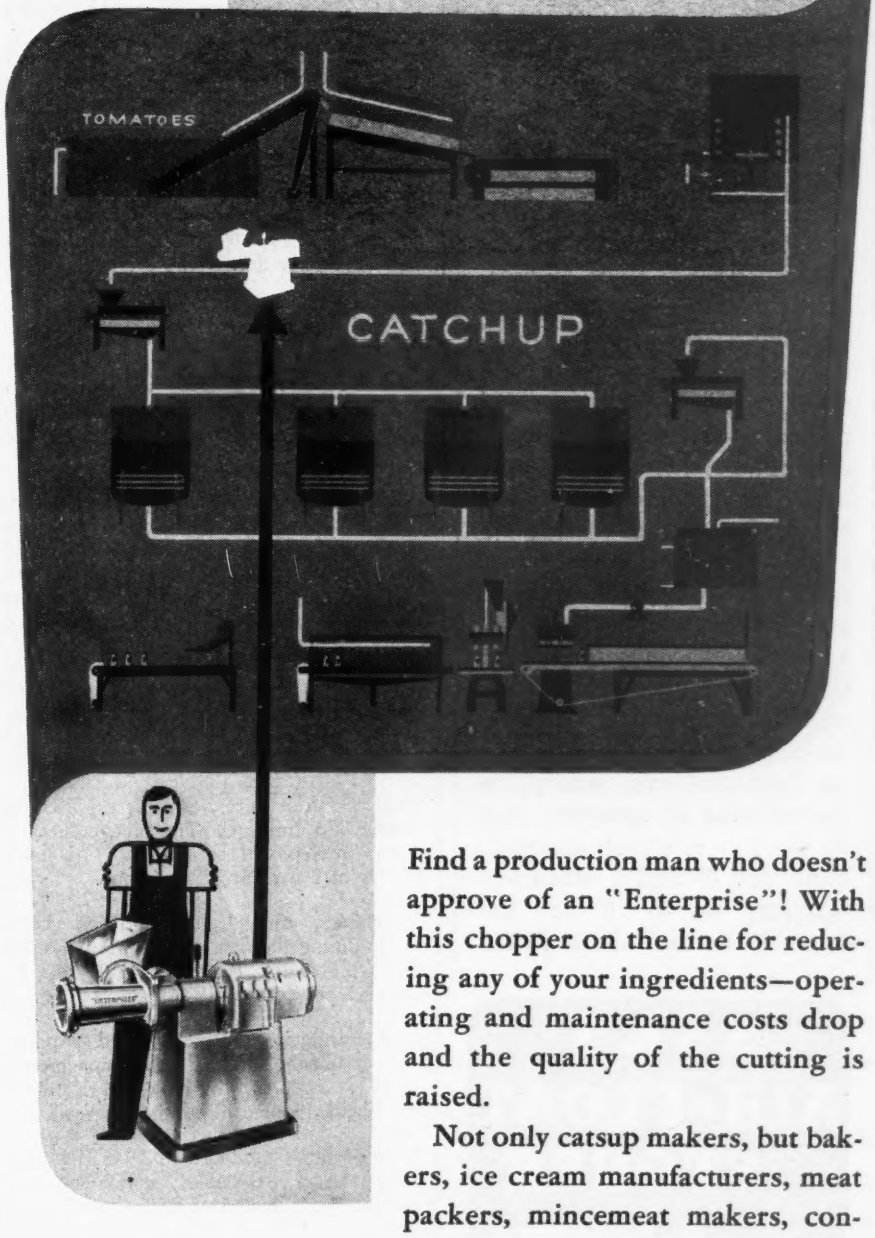
13-14—National Pickle Packers Association, 51st annual meeting, Hotel Stevens, Chicago, Ill.

FEBRUARY

24-26—Pennsylvania State College, 53rd annual ice cream short course, State College, Pa.

Whether you spell it
catsup, catchup or ketchup

raise quality, cut costs with an "Enterprise"



Find a production man who doesn't approve of an "Enterprise"! With this chopper on the line for reducing any of your ingredients—operating and maintenance costs drop and the quality of the cutting is raised.

Not only catsup makers, but bakers, ice cream manufacturers, meat packers, mincemeat makers, confectioners . . . all have proved that "Enterprise" Choppers do the job better—for less.

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INDICATORS

Raw Materials

Flour production in November, 1943, as reported by *The Northwestern Miller* for mills accounting for 73 percent of the milling capacity of the United States, totaled 15,143,227 sacks, compared to 15,165,303 sacks in October, 1943.

Sugar imports (raw) for 1943 up to December 12 totaled 3,725,302 tons, compared to 2,560,392 tons for the corresponding period a year earlier.

Cocoa bean imports into the United States in 1943, up to mid-December, were reported at 3,758,299 bags, compared to 1,397,543 bags during the same period of 1942.

Production

Sardine pack in California in 1943, up to November, totaled 1,437,863 cases, 2 percent above the pack made in the same period of 1942.

Fishery products output at major U. S. fisheries during the first nine months of 1943 was reported by the Department of the Interior as running about 10 percent over the output for the like period of the preceding year.

Fish, canned, exported on Lend-Lease during the first nine months of 1943, is reported by FEA at 163,300,000 lb., about 21 percent of the total U. S. supply for the period.

Fruit and fruit juices, canned, exported on Lend-Lease during the first nine months of 1943, are reported by FEA at 84,200,000 lb., about 2 percent of the supply.

Vegetables, canned, exported on Lend-Lease during the first nine months of 1943, are reported by FEA at 59,100,000 lb., about 1 percent of the supply.

Milk, evaporated and condensed, exported on Lend-Lease during the first nine months of 1943, is reported by FEA at 441,500,000 lb., about 14 percent of the supply.

Canned foods produced in 1943, including fruits, juices, vegetables, soups and baby foods, are estimated at 330,000,000 standard cases, of which about 230,000,000 cases are allotted to U. S. civilians and the remainder will be held for noncivilian use.

Canned fruits and vegetables moved into consuming channels during the six-month period, April to September, 1943, totaled 127,326,000 cases. This is 8,308,000 cases more than OPA's schedule of movement for these food products.

Corn, sweet, canned in 1943 totaled 28,755,036 standard cases, according to National Canners Association. This pack compares to 32,118,372 cases packed in 1942.

Snap bean production for processing, according to a recent estimate of the U. S. Department of Agriculture, totaled 251,300 tons, 8 percent over the 1942 output.

Oleomargarine sales in October, 1943, as indicated by sales of internal revenue stamps, totaled 59,001,910 lb., an increase of 70.4 percent over sales in October, 1942. For the first ten months of 1943, sales were 413,443,006 lb., up 49 percent from sales in the corresponding 1942 period.

Eggs, dried, produced in October, 1943, totaled 23,237,000 lb., compared to 22,838,000 lb. in October, 1942. For the first ten months of 1943, the total output was 218,869,000 lb., compared to 202,996,000 lb. for the same months of 1942.

Eggs, liquid, produced in October, 1943, for freezing, drying and immediate consumption totaled 53,797,000 lb., compared to 55,076,000 lb. in October, 1942.

Cheese, American, produced in October, 1943, totaled 54,560,000 lb., compared to 56,884,000 lb. in October, 1942. For the first ten months of 1943, production was 688,460,000 lb., compared to 837,846,000 lb. in the like period of 1942 and to a ten-year average of 449,756,000 lb. for the period.

Butter, creamery, produced in October, 1943, was 107,645,000 lb., compared to 123,954,000 lb. in October, 1942, and to a ten-year average of 129,096,000 lb. for the month.

Butter, creamery, produced in the first ten months of 1943 totaled 1,495,210,000 lb.,

CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
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Director of Circulation:

Please change my address on "Food Industries"

From .....

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To .....

.....

Signed .....

CONSTRUCTION NEWS

	Pending (thousands)	Awarded December (thousands)	Total Awarded 1943 (thousands)
Bakery	.....	.....	$40
Beverages	$40	.....	295
Canning and Preserving	140	.....	615
Cold Storage	.....	.....	230
Confectionery	330	.....	2,027
Grain Mill Products	1,230	$125	205
Ice Manufactured	.....	.....	.....
Meats and Meat-Products	40	.....	565
Milk Products	460	80	1,311
Miscellaneous	655	830	4,356
	$2,895	$1,035	$9,644

ompared to 1,533,272,000 lb. in the same eriod of 1942 and to a ten-year average r the period of 1,505,308,000 lb.

Milk, evaporated, produced in October, 943, was 188,896,000 lb., compared to 03,114,000 lb. in October, 1942. For the rst ten months of 1943, total production as 2,705,949,000 lb., 13 percent below he output for the same months of the revious year.

Condensed milk, all kinds, produced in Oc-ber, 1943, totaled 57,100,000 lb., com-ared to 58,152,000 lb. produced in Oc-ber, 1942.

Milk, dried, whole, produced in October, 943, was 8,975,000 lb., compared to 6,-79,000 lb. in October, 1942. For the nuary-October period of 1943, the output as 107,150,000 lb., an increase of 107 per-nt above production in the same months f the preceding year.

Milk, dried skim, produced in October, 943, totaled 24,765,000 lb., compared to 9,913,000 lb. in October, 1942. For the st ten months of 1943, the output was 35,386,000 lb., a drop of 22 percent be-w output in the corresponding months of 942.

Chicks hatched in October, 1943, totaled 5,465,000, compared to 23,365,000 in Oc-ber, 1942, and to a 1938–1942 October erage of 17,229,000. For the first ten onths of 1943, hatchings were 1,382,316,-00 chicks, compared to 1,145,314,000 icks hatched in the corresponding months year earlier.

Indexes

usiness activity index (1923–1925 = 100) Business Week stood at 242.2 on Decem-r 11, 1943, compared to 242.6 a month rlier and to 220.7 on the corresponding 942 date.

Weekly wholesale food price index of Irv-g Fisher stood at 123.4 on December 9, 943, compared to 117.1 on the correspond-g 1942 date.

Cost of living index of National Industrial Conference Board for November, 1943, was 03.7 (1923 = 100). A month before this dex stood at the same figure, while the gure was 100.5 in November, 1942.

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OPA Price Regulations

Frozen Products—Three amendments to MPR 409 covering frozen fruits, berries and vegetables of the 1943 pack have been issued by OPA. According to amendment 5, effective December 4, only packers in 19 states may add to their maximum prices permitted mark-ups for incurred wage increases, after approval by WLB. Amendment 6, also effective December 4, provides a method which processors of California freestone peaches, Concord grapes, apples and blackberries can determine the increase in maximum prices. The advances range, at retail, from ¾ cent to 3 cents a pound. In amendment 7, issued on December 8, only those packers who buy plums grown in Oregon, Washington, California, Idaho and Utah can include an adjustment for raw material costs in their maximum prices.

Sausages—Specific dollars-per-hundredweight wholesale ceiling prices were established by OPA on December 7, in amendment 10 to MPR 389, for loaves, Lebanon sausage, a number of lean meat sausage products and Polish and liver sausages. Detailed specifications listing the ingredients of each product are set forth in the new regulation, which also requires descriptive labeling. Another new change is that sausage trade names may be added to descriptive labeling.

Apple Products—Maximum prices for processors were set for 11 apple products at levels well above those of 1942 in MPR 493, published on November 16. A national dollars-and-cents basis was established for seven of these commodities; namely, dried apples, boiled cider, bland apple sirup, vinegar stock, depectinized concentrated apple juice, concentrated cider and filtered concentrated apple juice. Prices for the other four items—packed apples, applesauce, packed apple juice and sweet cider—were set on a formula basis. On December 9, OPA's amendment 1 to MPR 493 revised the provision establishing a maximum price of 17 cents a gallon for vinegar stock. The regulation now applies to vinegar stock of 12 proof or more alcoholic content on a bulk basis rather than 16 proof.

Creamed Cottage Cheese—In an order issued by OPA on December 6, all creamed cottage cheese containing 4 percent or more butterfat content will be rationed. Previously, only cottage cheese with a fat content of more than 5 percent was rationed under the meats-fats-cheese program.

Preserves, Jams, Jellies—Pricing methods for packers of jams, fruit preserves and jellies made from apples, apple products and frozen grapes were announced by OPA on November 26. Amendment 3 to MPR 473 provides methods which reflect increases in 1943 fruit costs.

Corn Products—To permit sales of degerminated corn meal and corn grits by manufacturers in states requiring special minimum requirements for fortification of these products, the cost of enriching may be added to the maximum base-point prices at the rate of 13 and 18 cents per 100 lb., according to the OPA edict of December 13. The order, amendment 8 to MPR 305, makes it clear that only when 1 lb. of meal or grits contains at least 1.2 milligrams of thiamine, 1.4 milligrams of niacin and 11 milligrams of iron, may the enrichment cost be included.

Fluid Milk—Prices of fluid milk sold to the Army or Navy may not exceed the seller's lowest wholesale price, according to OPA's December 7 amendment 8 to supplementary regulation 14A of GMPR. The order permits the addition of either ½ cent a quart or actual transportation costs from the seller's plant to the point of delivery at not more than lowest common carrier rates.

Fruits and Vegetables—Important changes in the price regulation of packed food products were made in OPA's amendment 19 to MPR 306, effective December 14. Because of an increase in raw material costs, formulas by which processors must determine maximum prices for canned sweet potatoes, brined cherries, maraschino cherries, canned mushrooms and processed dried prunes and dried prune products will be higher. Processors' maximum prices for No. 2 cans, recently released by WPB, of turnip and mustard greens were established for the first time.

Bakery Products—Bakers may increase the size of their bread loaves up to 25 percent over the 1942 size and add to their maximum prices proportionately, according to supplementary regulation 14B to GMPR, announced by OPA on December 13. MPR 495, issued on November 23 by OPA, set dollars-and-cents ceilings at the producer level for chocolate-coated ice cream cones and permitted increases for cracknells, fig bars, ice cream cones and Trenton oyster crackers.

Corn—The maximum price of corn was raised 9 cents a bushel, from $1.07 to $1.16, at the Chicago terminal market, in OPA's second revised order, MPR 346, released on December 6. This action was taken to bring about a more normal flow of corn into terminal markets and distributing channels.

Fats and Oils—Manufacturers who were restricted by WPB during the last three months of 1942 in the use of fats and oils in processing food products, may apply for an adjustment in their point allowance for the last quarter of 1943, according to amendment 87 to RO 16 issued by OPA on December 14. Application is made on OPA Form R-135.

Grapefruit—The regulation controlling sales for California and Arizona grapefruit was amended by OPA on November 30, when packers' prices for the grapefruit were increased. The advance in price in amendment 7 to MPR 292 brings the price of California and Arizona grapefruit in line with Texas and Florida grapefruit prices.

Frozen Boneless Beef—Because packers must use inexperienced labor in their plants to cope with the steady rise in the production of frozen boneless meat for the armed forces their costs have risen. In amendment 3 to RMPR 169, issued on December 1 by OPA, a maximum advance of up to 1 cent a pound can be added to the already established price for this product.

Potato Chips—Manufacturers must pass on to the consumer any reduction in potato chip prices, according to amendment 1 to MPR 457, issued by OPA, effective November 26. A list of ceiling prices that they may charge wholesalers, primary distributors and retailers, as well as ceiling prices on sales by wholesalers and primary distributors to retailers, is provided in the recently revised regulation.

Apple Butter—Maximum prices of apple butter for packers and distributors other than retailers and wholesalers were announced by OPA in MPR 498 issued on December 6. Prices for apples were increased from 80 cents to $1.65 per 100 lb. and for apple chops from 7½ to 15 cents a pound. The $1.65 figure for apples is the maximum price for U. S. No. 2, Cannery Grade, "A" varieties.

Grains—Due to the steady advance of feed prices, OPA, with the consent of WFA, "froze" the prices of oats, barley and sorghum grains in TMPR 33, effective December 6. Oats and barley prices were frozen at the highest level of the five-day period from November 29 to December 3. Ceilings were set for temporary sorghum grain at prices approximating parity.

Prepared Flour Mixes—The regulation controlling the price of prepared flour mixes was amended on November 22 by OPA in amendment 1 to MPR 462. The most closely comparable commodity used in the formula cannot have a maximum price in excess of 165 percent of direct cost. Pricing methods for distributors, except wagon wholesalers, wholesalers and retailers, apply only to sales for their own account and not to sales they make as brokers. Notice of permitted increases in maximum prices to wholesalers and retailers must be attached to the case or carton sold or, where the sale is direct to a retailer, attached to the single large shipment or stated on the invoice. Where the processor is unable to determine his maximum price, he can deliver to purchasers, but he cannot render an invoice or receive payment until the price has been approved by OPA.

Packaged Tea—On December 20, OPA established maximum prices for Ceylon, Travencore and India blends of packaged tea in 1-lb. and ½-lb. containers, according to amendment 68 to revised SR 14, effective December 27. This action was brought about by WFA's authorization of the use of such packages.

Raw Cane Sugar—In amendment 3 to RPR 16 issued December 17 and effective December 23, OPA announced that it would recognize as legal the contracts made for sales of raw cane sugar from offshore producing areas to United States Pacific ports at $3.54 a hundredweight, a reduction of 2 cents per 100 lb. The order also states that it is not necessary for sellers to submit this deduction to OPA for approval.

WPB Orders

Flow Diversion Valves — Flow-diversion valves for use in pasteurizing milk have been exempted from the restrictions of Schedule I of Limitation Order L-272, because valves manufactured under the restrictions of this schedule would not meet the requirements of the U. S. Public Health Service Code. The limitation order prohibited the use of union ends, which are essential for valves which must be completely dismantled each time they are used.

Tapioca—An amendment to M-333 was issued on November 30 to remove a restriction which imposed a hardship on small dealers whose total sales customarily are made up of a large number of small shipments. The order permitted customers to accept without restriction the delivery of 500 lb. or less per month of tapioca flour or its derivatives, but required that such small-lot sales be limited to 5 percent of the total sales by the distributor during the preceding month. The amendment permits distributors to make any proportion of their sales in lots of 600 lb. or less.

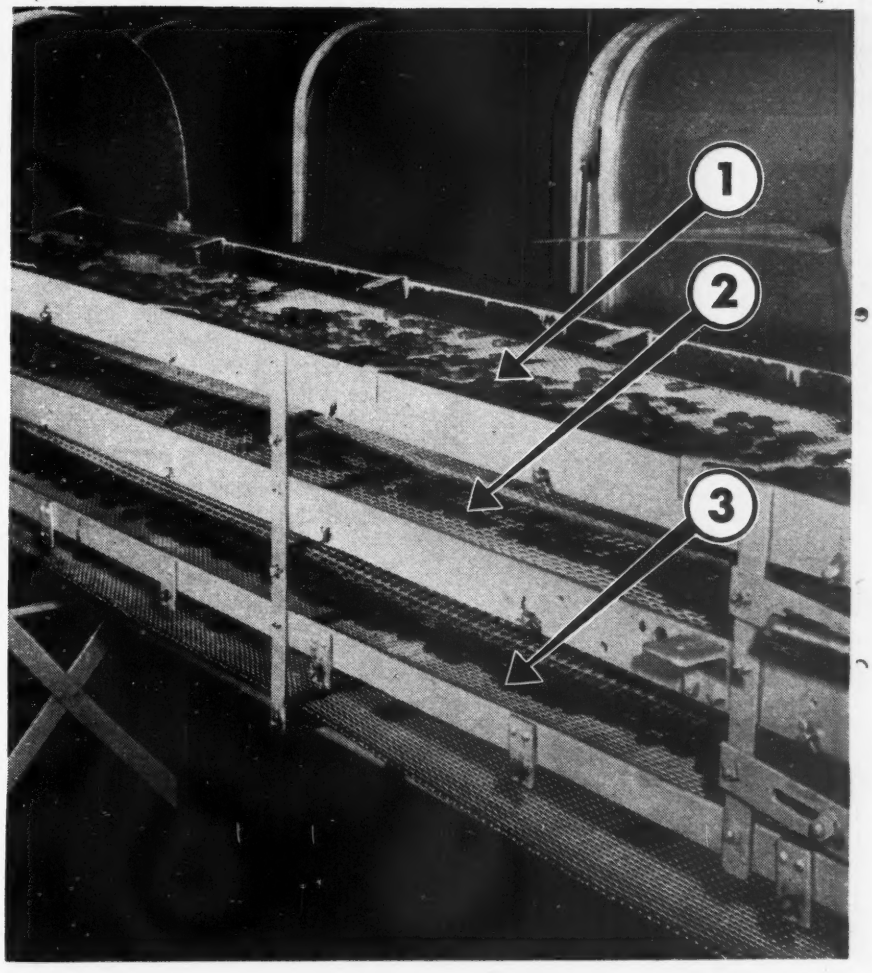
Sugar Processing Machinery—Sugar processing machinery and equipment have been removed from the prohibited list of WPB Limitation Order L-292 and are now covered by Schedule V of the order, so as to permit production of equipment bearing WPB ratings of AA-5 or higher. It is expected that most of the production will be for replacement, but new facilities also may be approved under the terms of the schedule just issued.

Tin Cans—Tinplate waste-waste can now be substituted for frozen tinplate in cases where frozen tinplate is specified as a can material for packing a product under Conservation Order M-81. This is in accordance with Direction No. 1 issued on December 11 by WPB.

Food Equipment—The rating floor on sales or deliveries of all food-processing machines was reduced from AA-3 to AA-5 or higher through an amendment to Limitation Order L-292 issued on November 20. And winery machinery was added to the list of equipment which it is now prohibited to manufacture. Several minor changes affecting simplification and standardization also were incorporated in L-292.

Shipping Containers—Shippers of oranges and grapefruit who do not use their full quota of wooden shipping containers may transfer any unused quota of boxes to another shipper, but only within the same area, under an amendment to supplemental Limitation Order L-232-a issued on December 4.

Plant Equipment—On December 9, WPB issued direction 2 of Limitation Order L-41 to facilitate installation of processing equipment or relocation within the plant of any equipment. WPB permission is not required when the materials needed cost less than $500, for plants with 10,000 sq. ft. or more of productive floor area making goods other than those of schedule A of L-41.



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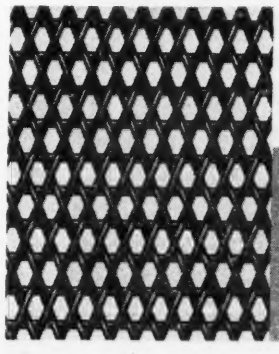

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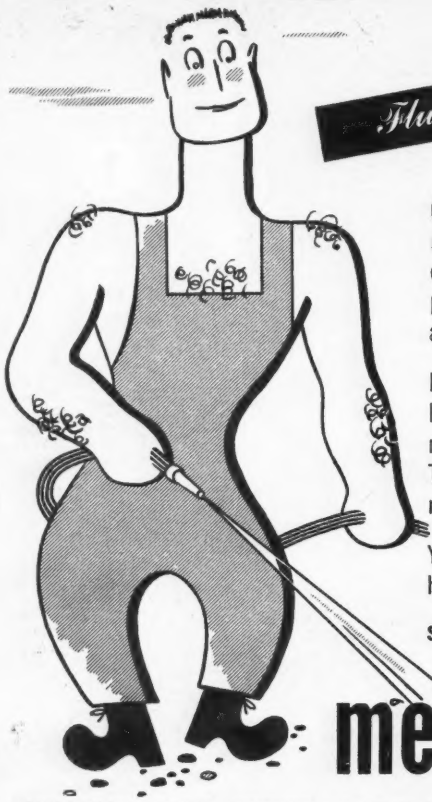

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WFA Orders

Wage Rates—Maximum wage rates for agricultural workers harvesting grapefruit, oranges and tangerines in Florida were announced by WFA on November 27. The action is based on findings of the USDA Wage Board in Florida, following public hearings. The rates, comparable to the averages paid during the last harvesting season, will permit the average worker to earn $7 to $9 per day.

Canned Food—Continuing its policy of making "contingency" reserves of canned foods available for civilian use, WFA on November 26 authorized the release of 2,600,000 cases of canned string beans and tomatoes which had been set aside from the recent pack. Contingency reserves are those held by canners to meet unexpected war demands over and above known requirements.

Citrus Products—The set-aside percentages of canned citrus products established in FDO 22.5, effective December 1, are the same as those in the preliminary announcement issued by WFA last month. Set aside quotas on grapefruit segments, orange juice and blended juice amount to the total permitted pack. Of an expected production of 20,500,000 cases of canned grapefruit juice, 7,400,000 cases are required to be set aside for government needs.

Vegetable Oils—Delivery to refiners of crude cottonseed, peanut, soybean and corn oils for refining will remain free from restriction through March 31, 1944, according to a WFA announcement of Dec. 3, 1943, which continues for three months the suspension effective last October. There is no change in authorizations for use of these oils or shipment of refined oil by refiners to other refiners or to margarine and shortening manufacturers.

Walnuts for Shelling—Increases in the volume of orchard-run walnuts going directly to shellers and in the percentage of culls in the current crop have reduced the need to set aside merchantable walnuts for shelling. FDO-82 was revised December 8 to reduce to 10 percent the proportion of merchantable walnuts which must be set aside for shelling. The order retains the provision that orchard-run nuts may be set aside, instead of graded and sized walnuts, provided that the total of merchantable nuts contained is equal to the required 10 percent of the merchantable walnuts shipped.

Slaughter Quotas—Slaughter of livestock for civilian consumption will remain without quota limitation by an extension on November 23 of the WFA order then in effect. The present extension is intended to facilitate marketing and slaughter of the record numbers of livestock now available.

Tea—An amendment to FDO 18.3, effective December 1, permits tea packers to accumulate extra tea for packing operations. It does not change the quantity of tea which packers may deliver. Commencing on January 1, regardless of his existing in-

ventory any packer may accept tea to the extent of 1¼ times his quarterly delivery quota. The provision that any unused portion of the quota for one period may be used by packers and wholesale receivers during the first calendar month of the following quota period remains in effect, but the amendment cancels the provision which permitted a portion of the quota for a succeeding period to be used during the last month of a quota period. The amendment adds the 1-lb. package to the sizes which may be packed.

Peanuts—Restrictions on sales and deliveries of farmers' stock peanuts have been eased by issuance of amendment 2 to CCC order 4, effective December 8. To the 700,000 tons previously authorized as aggregate sales and deliveries for cleaning and shelling is to be added a tonnage equivalent to that of the No. 2 peanuts crushed for oil under WFA orders and also the amount of any stocks damaged before shelling.

Bakery Products—WFA has taken steps to simplify and make more flexible the bakery products order. The major changes, which become effective on January 16 under amendment 5 to FDO 1, include: (1) Tightening of the provision prohibiting consignments, returns, credits and discounts. (2) Simplification or variety restrictions and ingredient provisions applicable to sugar and shortening. (3) Extension of enrichment and ingredient provisions.

The provision concerning consignment selling will prohibit any purchaser from returning bakery products for any reason.

The amendment provides for the enrichment of yeast-raised products and all doughnuts, crullers and fried cakes to the extent that white flour is used. Biscuits and crackers are not subject to this provision.

As amended, the order limits the total number of varieties that a baker may make to 20 varieties of bread and 12 varieties of rolls.

The provision on ingredients no longer requires that the fat content of whole milk or high-fat soya flour be counted as part of the fat content used.

Sauerkraut—The freeze and set-aside order (FDO 84) on sauerkraut was terminated by WFA on December 13, making all remaining supplies and the remainder of this season's pack available for civilian consumption. Supplies of sauerkraut made available to civilians will be marketed by packers in barrels and kegs, as no tin or glass is allocated for this commodity.

Tomato Catsup—From specific reserves held for the government by canners, the WFA on December 6 released 990,000 cases for civilian use. This makes a total of 1,800,000 cases which have been released recently.

Dehydrated Potatoes—Because prospective supplies seem adequate to meet all government requirements, Irish potatoes have been removed from the list of dehydrated vegetables reserved for war needs. Dehydrators, however, are required to continue holding stocks on hand on December 1 for delivery to the government or alternative disposition by the Director of Food Distribution.

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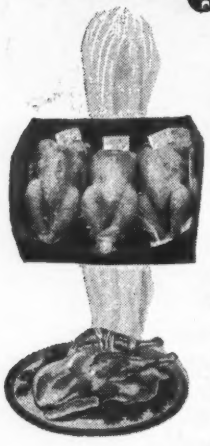

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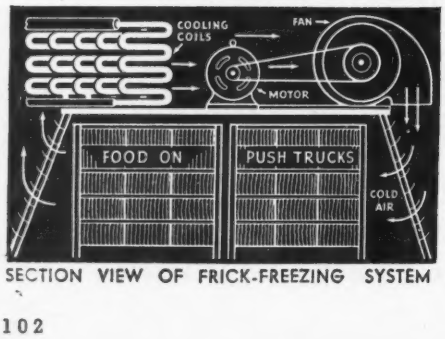
Engineering tests show that when the air blast is kept cold enough, it can absorb but little moisture from the foods. Turkeys and all other poultry come out with 99-66/100 per cent of their original weight.

Millions of pounds of fresh foods are being quick-frozen every day with Frick Refrigeration. It's the ultimate where both quality and large volume must be maintained.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U.S.A.



SECTION VIEW OF FRICK-FREEZING SYSTEM

CAPITAL VIEWS

PLENTY OF STEEL—By mid-December it had become evident that WPB must release steel for many new industrial jobs not directly a part of the war effort. And executives and engineers planning for the future of food factories now have the three essentials for modernization, remodeling, or even plant expansion. There is plenty of business, which establishes the companies' credit; materials for the construction of equipment, such as alloy steel, can now be had rather easily; and there is prospect of plenty of new factory workers to operate new facilities by the time they can be completed in the spring or summer. Aggressive plans now for new construction will enable food factories to do their part in preventing unemployment months hence when the cut-back in direct war manufacture occurs.

CORN PRICE—The ceiling price for corn was raised about 9 cents a bushel by OPA action early in December. This is expected to move more grain from the farms for use as cattle and poultry feed. But the corn processors, especially the wet grinders, did not welcome the action when it came, months too late for their relief. When it arrived it merely served further to increase the cost of corn sirup and cornstarch. The financial future of the corn products industry became, therefore, largely dependent on new price ceilings for the products rather than for the raw material. This is another example of the horrible consequence of amateur management of economic factors. The timing was so bad that the results were almost worse than no action at all, some of the outstanding executives of the industry believe.

SURPLUS GOODS—The inter-agency controversy of Washington continues over the question of who will manage the disposal of surplus war goods. Fortunately, the food industries need not worry much about a surplus of foods. Those which develop temporarily here and there can be absorbed quickly by willing housewives with plenty of purchasing power, or by UNRRA. But it is quite possible that food plant engineers will be able to pick up from other industries quickly some supplies or equipment for immediate use. There will be little real food equipment so available; but a few valves, a bit of piping and other like facilities from surplus stocks may enable quick action in repairs too long deferred. Nobody yet knows who will be in charge of such distribution. But it is hoped that the customary merchandising agencies of the country will handle actual sales to users when they occur.

MORE ENRICHMENT—The Food Distribution Administration has ordered that enrichment be practiced for all types of yeast-raised commercial bakery products to the extent that white flour is used. This adds rolls and buns, coffee cake, doughnuts and other products to bread as a part of the compulsory enrichment program. The actual gain in vitamin consumption, speaking nationally, will be negligible. But the increased cost to the baking industry will not be.

WEST-BOUND FOOD—For a short time this winter there is likely to be a small supply of west-bound refrigerator cars available for hauling to Pacific Coast States other manufactured foods that do not need refrigeration. These are the empties returning from their job of bringing Western fruit and vegetables to the central and eastern states. ODT has suggested that industrial firms finding difficulty in getting west-bound space consider these refrigerator cars even for those commodities which do not require refrigeration. They are particularly good for handling food, which is much more welcome as clean freight in such cars than heavy industrial commodities that leave the car dirty. Furthermore, it should not be forgotten that any food company which can do so will be wise to build up a surplus stock of its goods in the Far West during the next few months. Later, the more aggressive Pacific fighting is likely to make it difficult to get any west-bound space at all. It will be a lucky management that can spare goods for such stock-building during the next six months.

SOYA USE PUSHED—Advocates of soya flour as a part of white flour or white-flour bread have made enough impression to com-

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pel reopening of the flour standards proceedings by Food and Drug Administration. But their action also is delaying the issue of the standards, probably by six months.

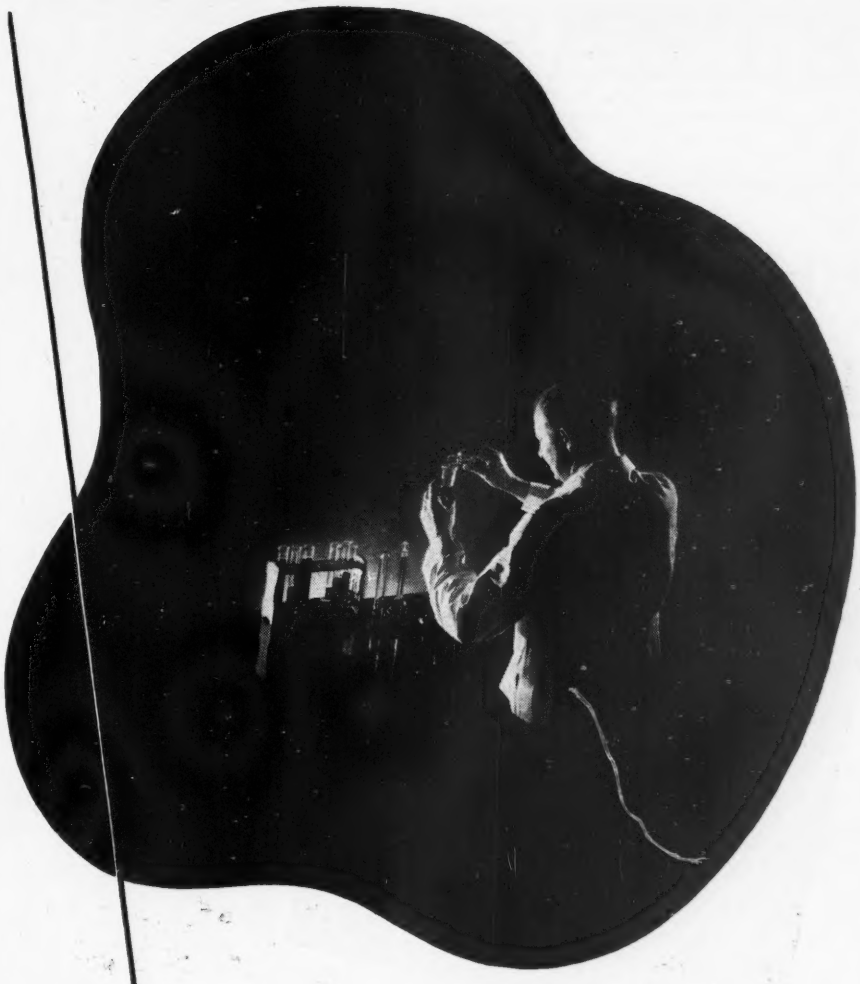
RETURNS FORBIDDEN—Return of bakery products has been forbidden by an amendment to food distribution orders which govern bakery activities. This amendment provides that: "Consumers cannot return *for any reason* bakery products which they have purchased." The italics are part of the official announcement, and the rule applies to commercial establishments like stores and restaurants as well as to individual buyers. The nominal purpose is "a conservation measure" intended to prevent returns that were "completely wasted." The cynics of the industry probably will wonder why it is not better to have surplus goods returned in good condition for resale. What is the advantage, they may well ask, in compelling the consumer to waste them.

POSTWAR PLANS—Food manufacturers have only one kind of postwar planning to worry them right now. It has to do with getting enough raw material and enough packaging materials. The demand will long continue, except perhaps for certain luxury items, to be more than equal to productive capacity. The organization of the United Nations Relief and Rehabilitation Administration insures some degree of planning. Fortunately, these plans are gradually getting away from mere paternalism.

INTERNATIONAL TRADE—Weekly it grows more obvious in Washington that international relations are to be managed in two categories, both under the guidance of Elder Statesman, Secretary Cordell Hull. The political program will now be definitely a Hull plan of international relations, of which the Moscow Pact is the first important achievement. International goods movement will be guided largely by the newly established Foreign Economic Administration headed by Administrator Leo T. Crowley. The latter agency is going to put definite policies and plans around import and export affairs. And these plans will become for some time far more important to the food industries than any tariff or other trade barrier or control. Those who seek raw materials abroad and those who have any foreign markets must watch FEA with greatest care. It holds the power of life or death over such goods movements.

RETURNABLE CONTAINERS—Many packaging materials must be reused now despite the fact that we have always thought of them as being throw-away, one-trip items. The scarcity of pulp, paper and various packaging materials is now as serious as the metal container problem. Plans for reuse of any kind of container should be arranged wherever practicable. The fact that this is not altogether economic should not prevent reclaiming plans.

STREAM POLLUTION—Postwar planning in Washington contemplates many types of public works. High on the list is the job of preventing stream pollution in the regions subject to Federal control. This means that every food plant must be ready to control its effluent rather promptly.



The man in control... Few products are manufactured under such close, scientific controls as fine chemicals — yet even here the human element is important.

That's why *every* batch of *every* Monsanto food flavoring chemicals is *double* checked in the control laboratory before a single pound leaves for your plant. And that's why *every* Monsanto control chemist is carefully trained in the latest analytical techniques.

The skill and knowledge of these men are your guarantee of *controlled* quality in *every* shipment you receive from Monsanto. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, St. Louis, Mo.
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Monsanto Flavoring Chemicals of *Controlled* Quality
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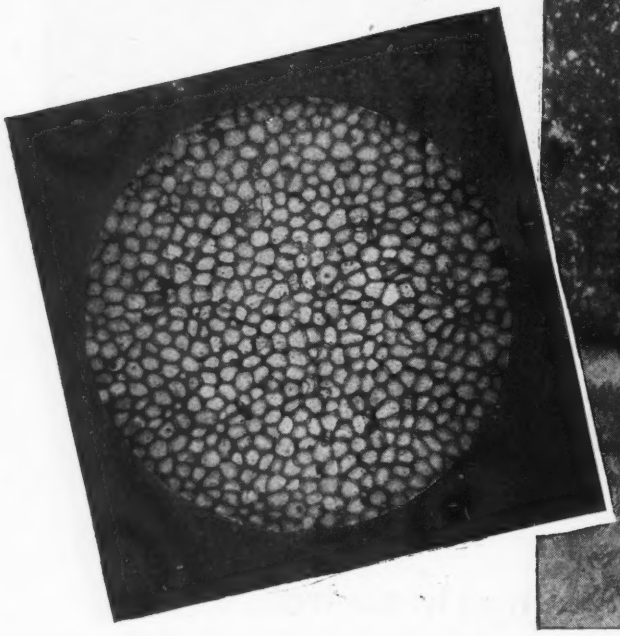
Cork has been provided by nature with a remarkable cellular structure which gives it special advantages as an insulator. At right, a scene from Portugal shows cork being stripped from the cork oak before shipment to our factories for fabrication into insulation products.

THERE IS *NOTHING* LIKE CORK . . . . . .



This photomicrograph of cork shows how the cells completely fill the cork structure. Although greatly enlarged, no voids are evidenced between cells.

Natural Cork—Cork in its natural state consists of minute hermetically sealed cells containing "dead" air . . . approximately 200,000,000 cells per cubic inch. Cell walls are resinous, resilient, and impervious to the passage of air. There is no "free" air to conduct heat or moisture through the mass and no capillary attraction.

Mundet Cork Insulation—Natural cork is ground into ¼" to ⅝" granules and compressed under heat in moulds to produce Mundet flat or shaped cork insulation. Air spaces between granules are eliminated by the pressure and the milled resin in the cell walls cements the mass into a homogeneous structure retaining the properties and high insulating value of natural cork.

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MUNDET CORK PIPE COVERING

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MUNDET CORK LAGGING

The unique qualities in cork that have long made it the standard of comparison, recommend its use wherever low temperature must be controlled.

When you buy Mundet Cork Insulation, you buy insulation *service,* lasting and dependable: conservation of low temperature, minimum upkeep and maintenance. In walls, floors, ceilings; in tanks and in pipelines Mundet Cork Insulation is a natural barrier to heat flow—sure protection for all low-temperature purposes.

Mundet offices in principal cities offer responsible assistance, including complete installation. Write for free copy of our latest catalog, containing specification information, heat loss charts and other helpful data covering Mundet Cork Insulation in its many applications. Mundet Cork Corporation, Insulation Division, 65 South Eleventh Street, Brooklyn 11, N. Y.

MUNDET CORK INSULATION

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INDUSTRY

Blatz Brewing Co. has sold its 92-year old plant in Milwaukee, Wis., to Schenley Distillers Corp., New York, for $6,000,000. There will be no change in the personnel or operation of the company under the new ownership.

Burry Biscuit Co., Elizabeth, N. J., has furthered its expansion in the bakery field by purchasing Holtzman's, Inc., Myerstown, Pa., one of the largest pretzel baking companies in the country. Acquisition of Holtzman's is the third made by Burry in recent months.

General Foods Corp., New York, has purchased Jersey Cereal Co., Chicago, with no change in personnel.

Grand Valley Packing Co., Ionia, Mich., recently was damaged by a fire in its warehouse estimated at $25,000.

Kerr Gifford & Co., Portland, Ore., has bought Walters Flouring Mill, Pendleton, Ore., to replace its Diamond Flour Mills in The Dalles, recently destroyed by fire.

Land O'Lakes Creameries, Inc., plans to construct a $200,000 milk drying plant at Mondovi, Wis.

Madzoon Food Products, Inc., Houston, Tex., manufacturer and distributor of cultured milk food, has enlarged its plant to twice its original size.

Merchants' Creamery Co., Cincinnati, Ohio, has acquired Western Milk Co., Kansas City, Kan., manufacturer of dry milk powder. Purchase of the company will give Merchants' five butter and milk processing plants in the West.

HOWARD P. WARREN

Minute Tapioca Co., Inc., Orange, Mass., a subsidiary of General Foods Corp., New York, has promoted Howard P. Warren, formerly vice-president and general manager, to the presidency of the organization. Mr. Warren has been with Minute since 1919. He was made manager in 1926 and elected vice-president in 1940.

T. R. BAXTER

Formerly purchasing agent for Standard Brands, Inc., New York, T. R. Baxter has been appointed manager of packaging and package development. Mr. Baxter has had extensive experience in packaging, and he will be in charge of current packaging plans and also postwar packaging for Standard Brands' products.

Nabob Food Products, Ltd., Vancouver, B. C., has acquired Dad's Cookie Co., Ltd., also in Vancouver, with the exception of that part of the business situated on Vancouver Island.

Pasco Packing Association has begun operations at its large concentration plant adjoining its cannery at Dade City, Fla. Completion of the new concentration unit gives Pasco Packing one of the world's largest citrus processing plants.

Piedmont Brands, Inc., has made plans for the construction of five new buildings at its cannery in Lynchburg, Va. One unit will be built immediately, another in 1944, and the remaining buildings are to be constructed after the war.

Regan Canning Co. plans to erect and operate a $50,000 vegetable and citrus products canning plant in McAllen, Tex.

United Fruit Co. recently received the Security "S" pennant at Pier 2, North River, New York. The award was made in recognition of the company's high degree of security against sabotage, fire and other destructive factors.

H. C. DIEHL

H. C. Diehl has been appointed director of the recently organized Refrigeration Research Foundation in San Francisco. Since 1940, he has been principal chemist and chief of the commodity processing division, Western Regional Research Laboratory, USDA.

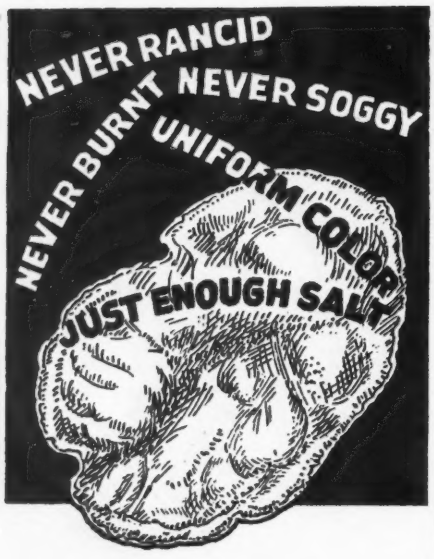
C. A. ECKBURG

C. A. Eckburg, who has been president of Borden Cheese Co. since 1941, has been named a vice-president of Borden Co., New York. Previous to his affiliation with Borden, he was with the United States Department of Agriculture. He entered the cheese industry in 1925.

PERSONNEL

Lawrence W. Baff, formerly owner of Lardan Packing Co., Maspeth, L. I., has organized the Jamaica Canning Co., Jamaica, N. Y., which will manufacture frozen food products and frozen dog foods.

Lawrence W. Bass, at one time director of research of Borden Co. and now director of the New England Industrial Research Foundation, Boston, has been elected vice-president of American Institute of Chemical Engineers.



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Can you realize the profit in producing — continuously — perfect potato chips?

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you are assured of a perfect product. Machine is adjustable, and quickly changed, for turning out light, dark or medium chips — all crisp, clean and salted to a delicious flavor.

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James H. Black and William R. Thele have been appointed members of the board of directors of Sprague-Warner-Kenny Corp. Mr. Black, a vice-president of the corporation, was also appointed general manager of the Sprague-Warner division, while Mr. Thele also becomes a vice-president of the corporation.

J. F. Brandt, in addition to his position as comptroller of Swift & Co., Chicago, national meat packing organization, has been named vice-president of the company.

Harry C. Cade is now director of research for Chapman & Smith, Chicago manufacturer of bakery supplies. He formerly was in the general laboratories of Libby, McNeill and Libby, Blue Island, Ill.

Fred H. Dellwo, production technologist with Cascade Frozen Foods, Seattle, Wash., until December 15, has become food engineer, with Ball Bros. Co., Muncie, Ind.

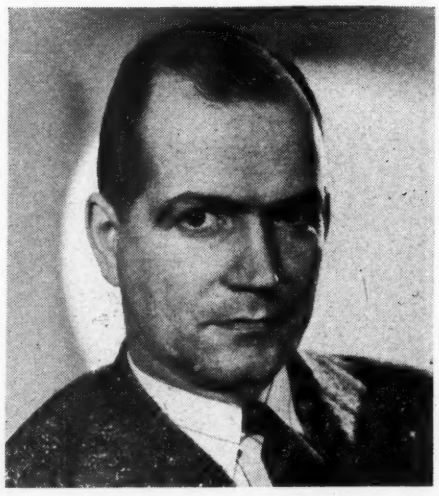
Edmund L. Dunn, president of the New England Fish Exchange, has been named president of the Atlantic States Marine Fisheries Commission.

Howard O. Frye, former vice-president and general sales manager, has been made vice-president and general manager of General Foods Corp., succeeded by Arthur E. Fest.

Mary Fuller and Charles Steinmetz have joined the staff of Citrus Concentrates, Inc., Dunedin, Fla., to do research in the field of bacteriology and fermentation. Mary Fuller formerly was with Libby, McNeill & Libby.

Edmund J. Garland, of New Orleans, has been reelected president of the Louisiana Sugar and Rice Exchange.

Raymond E. Gaylord has been promoted to sales manager of all Standard Brands' grocery products in the company's central region.



ALLAN C. JOHNSON

Best Foods, Inc., New York, has elected Allan C. Johnson to the position of director of industrial relations. Prior to joining Best Foods, he was director of personnel for New England Shipbuilding Corp., in Portland, Me.

John F. Gismond has been appointed price executive of the Fruits and Vegetables Branch of the Food Price Division of OPA. Geoffrey Baker becomes acting price executive of Grocery Products Branch.

Edward C. Joss, who has completed 42 years of service with the USDA, has recently retired as chief of Meat Inspection Division in the Food Distribution Administration. George E. Totten will succeed him.

M. L. Laing, of Armour & Co., Chicago, has been elected chairman of the Chicago section of the Institute of Food Technologists. John T. Knowles, Libby, McNeill and Libby, Blue Island, Ill., was named vice-chairman and H. E. Bernhardt, Campbell Soup Co., Chicago, treasurer. E. S. Stateler, FOOD INDUSTRIES, was reelected secretary.

Stephen Laufer has been elected assistant vice-president of Schwarz Laboratories, Inc., where he will be in charge of brewing technology and research. Earl D. Stewart of Berkeley, Calif., will be director of research.

E. Buckley Lewis, Jr., has resigned, because of ill health, his position as executive vice-president of the Pioneer Ice Cream Division of Borden Co., New York.

Charles T. Prindevile has returned to his former position as vice-president of Swift & Co. He recently resigned as head of WFA's Fats and Oils Branch.

Ernest W. Reid, formerly a member of the research staff of Union Carbide & Carbon Co., and more recently with WPB, has been made director of research and development for Corn Products Refining Co., New York.

M. K. Veldhuis, who has been in charge of the research laboratories of the Bureau of Agricultural and Industrial Chemistry at Pullman, Wash., has been appointed chief of the U. S. Citrus Products Station in Winter Haven, Fla.

DEATHS

Otto J. Betz, 75, at one time head of Betz Brewery, Philadelphia, Pa., Nov. 30, in Garden City, N. Y.

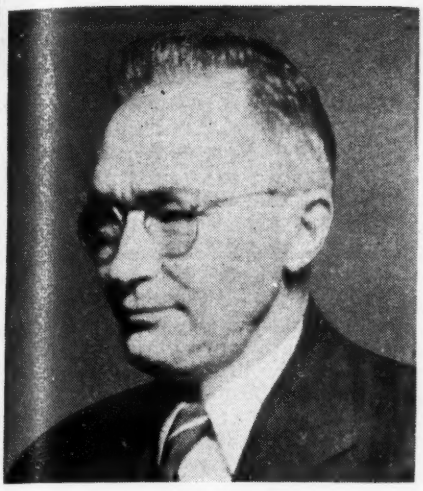
Charles B. Cain, 43, feed service director for Royal-Stafolife Mills, Memphis, Tenn., Dec. 9, in Memphis.

Washburn S. Chipman, 76, president, and Hugh W. Jacobs, 53, manager, of Pleasant Grove (Utah) Canning Co., recently. Mr. Chipman died in Provo, Utah, and Mr. Jacobs in Pleasant Grove, Utah.

James A. Dickey, 51, director of the Association of Sugar Producers of Puerto Rico since 1936, Nov. 20, in Washington, D. C.

Earle R. Pickett, 47, chief chemist for Beech-Nut Packing Co., Canajoharie, N. Y., recently, in Washington, D. C.

Edward F. Trego, 67, president and general manager of Hoopeston Canning Co.,



QUICK LANDIS

Formerly research chemist specializing on enzyme and cereal chemistry for the Fleischmann Laboratories of Standard Brands, Inc., and a very well-known figure in the food industry, Quick Landis died on November 28 in New York City. Only 42 years old, Dr. Landis was a leader in various organizations, among them American Association of Cereal Chemists, American Association for the Advancement of Science and American Chemical Society.

Hoopeston, Ill., and former president and director of National Canners Association, recently, in Washington, D. C.

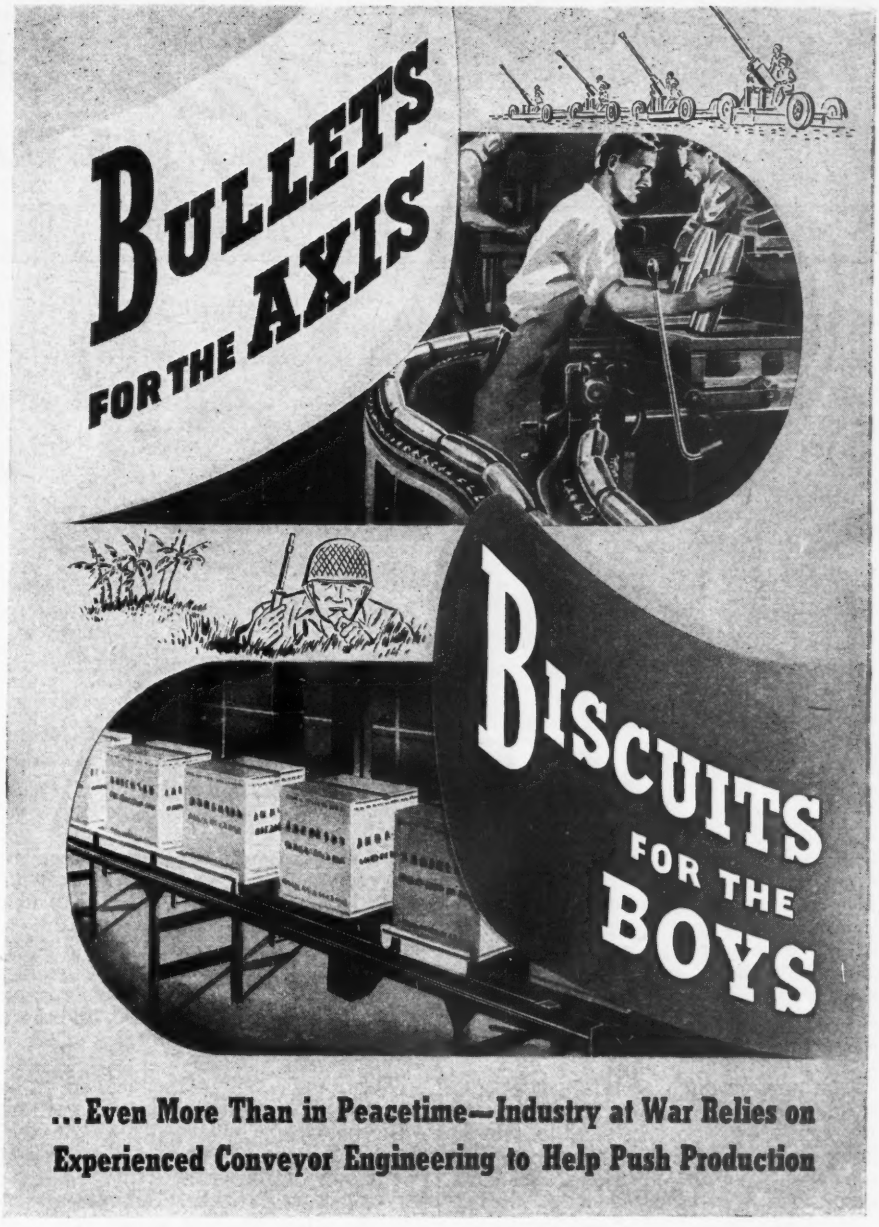
Jesse G. Waters, 65, formerly western district superintendent for the Chicago branch of Borden Co., recently, in Chicago.

ASSOCIATED INDUSTRIES

Allegheny Ludlum Steel Corp.'s Brackenridge, Watervliet and West Leechburg plants; Bastian-Blessing Co., Chicago; Mack Trucks, Inc., Long Island City, N. Y.; Nash Kelvinator Corp., Detroit; and Michael Yundt Co., Waukesha, Wis., have been presented the Army-Navy "E" award for outstanding war production work. The Maritime "M" pennant was received by Girdler Corp., Tube Turns Division. All three plants of Merck & Co., Inc.—the main branch at Rahway, N. J., the East Falls plant at Philadelphia, Pa., and the Stonewall plant at Elkton, Va.—have been awarded the "E" for the second time.

Atlas Powder Co., Wilmington, Del., to allow for the expansion of research programs vital to the war effort and to relieve the crowded conditions of present facilities, has established a central research laboratory near Wilmington.

Foote Bros. Gear & Machine Corp., Chicago, has introduced an active program stimulating workers to increase their war efforts. Part of this program includes shop posters telling how the company's products are serving in the operations of the Army and Navy.



...Even More Than in Peacetime—Industry at War Relies on Experienced Conveyor Engineering to Help Push Production

Munitions — arms — equipment — food — prime products of industry geared for war.

In many war plants specially designed and built Standard power and gravity conveyors — shell conveyors, for example — are doing their part to maintain peak production. In essential industries, such as food products plants — process industries — Standard Conveyors are in greater use than ever — keeping production flowing. An extensive and varied experience record qualifies Standard Conveyor Company to render valuable aid and counsel to production and plant executives. Tell us what you handle — how much — how far — our recommendations will prove worth while.

A valuable reference book, "Conveyors by Standard" Catalog FI-1 will be included in response to your inquiry.

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*DURAPAK PARCHMENTIZED CELLULOSE STRONG WHEN WET

Patapar NEWS

*PARCHKIN THE EXQUISITE ART PARCHMENT
*PATAWITE 9 lb. MANIFOLD THIN AND STRONG
*REG. U. S. PAT. OFF.

No. 110 Paterson Parchment Paper Company JANUARY, 1944 Bristol, Pennsylvania

WILD ENGINEERS

Out in the country where winter has solidified into still white cold, man's complicated arrangements for survival seem ludicrous compared to the simple ways of his animal neighbors. Where level snow indicates a small pond, you may see a row of dead sticks across one end, and in the middle a dome-shaped pile of brush. City folk might not detect anything interesting or unusual in that. In fact, the brush could be any untidy pile, instead of the home of a colony of beavers now serenely passing the winter snug and well-fed. Judged by utility standards and not aesthetic, the work of beavers is good engineering.

The American beaver owns a kit of four tools by which he builds with remarkable industry and personal satisfaction dams, lodges, and canals.

His chisels are very hard and yellow teeth, a pair above and a pair below, in the front of the jaws. Although man's wood-cutting tools have to be sharpened constantly, the beaver keeps his keen-edged by the expert way he uses them, cutting and sharpening. He tackles good-sized trees, possibly up to a foot in diameter, with these teeth; it only takes one or two strokes (bites) to cut brush half an inch thick—*zip* it goes like hedge clippers. That is why beavers are able to cut the great amount of brush used in their dams and lodges.

His grippers and hooks are the claws of his front feet. These are important for fast clean work, to hold the brush rigid when severing or to take a firm grip on a tree that is being cut down. Afterward these claws are used to grab and pull around the stuff, exactly as lumbermen's hooks. These forepaws are supple and skillfully used like hands.

The hind feet are wide and webbed to act as paddles for pushing the animal through the water. They deliver much more power than the webbed feet of a duck, for example, because the beaver is larger and stronger than a duck. And when he is propelling a mass of brush or a tree across a pond performs like a tugboat. Another important use for these wide hind feet is to act as two legs of a mighty tripod. The beaver spends much of his time erect, cutting wood, and those stocky hind legs and web soles afford a strong stance.

The fourth tool in the beaver kit is unique: his wide muscular tail, covered with imbricated scales like those of a fish. This style of tail is unlike that of his near relatives, the other rodents: squirrels, woodchucks, chipmunks, gophers, rats, mice. This tail is connected with the body by a device so mobile that it is as flexible as a ball and bearing socket. Thus, the tail can be turned vertical and serve as a forceful rudder (tugboats need big rudders). Or it can be folded up under the beaver's belly and used as a hod to carry mud packed between the abdomen and tail. Another function of the tail is to act as the third leg of the tripod with strength equal to the two hind legs. And finally this versatile implement is used as an alarm gong. When danger threatens, the tail is slapped against the water, and all the beavers in the vicinity disappear under water.

A beaver dam is built to make a pond deep enough so that beavers can swim around under the ice in winter; and for protection of the lodge in summer from predatory land enemies. Both dam and lodge are made mostly of brush or small trees. Larger logging operations are undertaken for food only. The principal article of diet of these busy vegetarians is the bark of poplars. They lay a big tree down for a feast.

To make the dam, sticks are placed with their butt ends upstream. This is good planning, as they are not dislodged as easily as if they were across the current. The brush is weighted down with mud and gravel and stones. Above the water line, the brush may be piled on haphazardly. Most beaver dams are under 50 feet long; but one famous dam on the Jefferson River, Montana, measured 2,140 feet; that is almost half a mile across.

The lodge is similarly built, with the brush in a circular pile, and the mud kept out of the center for the underwater entrance. The beavers enter from the bottom of the pond, come up under the dome of brush, and sleep on a platform just above the water.

Canals are built usually to float trees and shrubs to the pond. Large food trees are often transported over to the lodge and then sunk to the pond bottom by a load of mud, where the tender aspen bark becomes a winter larder.

Beavers are busy and skillful, but they are not clever. They do not know how to fell trees in the best direction. Often after a big cutting job, the food tree leans against a neighboring tree, and all that work was in vain.

Why Patapar is called the two-purpose paper

As a wrapper and packaging material, Patapar Vegetable Parchment actually gives *two* kinds of protection.

WITHSTANDS MOISTURE—Patapar keeps its full strength when wet. It even can be *boiled* without harm.

RESISTS GREASE — Patapar is proof against grease, fats, oils. Smear some on it and you'll see how it resists penetration.

It's this unique double duty characteristic that makes Patapar the ideal material for:

WRAPPERS for butter, meats, fish, cheese, poultry, shortening, ice cream, vegetables, dried fruits
CARTON AND BOX LINERS
BULK PACKAGING UNITS
MILK CAN GASKETS
MILK BOTTLE HOODS
PACKAGING COFFEE AND TEA
And many other uses

Paterson Parchment Paper Company
Bristol, Pennsylvania
West Coast Plant: 340 Bryant St., San Francisco
Branch Offices: New York, Chicago
Headquarters for Vegetable Parchment since 1885

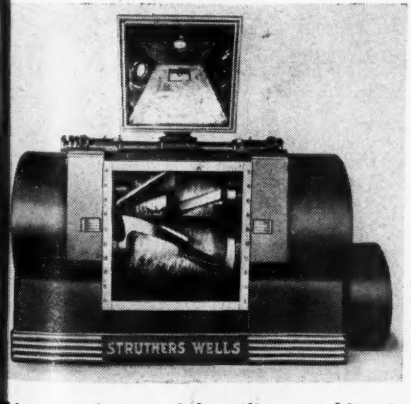
FOOD EQUIPMENT NEWS

Floor Treatment

SYNTHEX PRODUCTS CO., 2 West 45th St., New York 19, has developed Synrete, a liquid treatment for concrete floors to prevent dusting. The liquid is applied by mop or brush over any clean cement floor and does not change the appearance greatly as it is almost colorless. Two treatments are recommended for permanent dust prevention, although a single coat is sufficient to allay the nuisance. For particularly bad floors, additional coats are recommended. Where the floor has been previously painted and the surface is badly worn, the material can also be effectively applied. After the coating has hardened, paint can be applied if desired.

Kneading Machine

STRUTHERS WELLS CORP., Titusville, Pa., has developed new kneading machines that feature improved blade elements carried on widely spaced antifriction bearings to insure rigidity under severe operating conditions. It is claimed that the closer blade clearances thus obtainable permit intensive processing of food products and other materials requiring accurately controlled treatment.

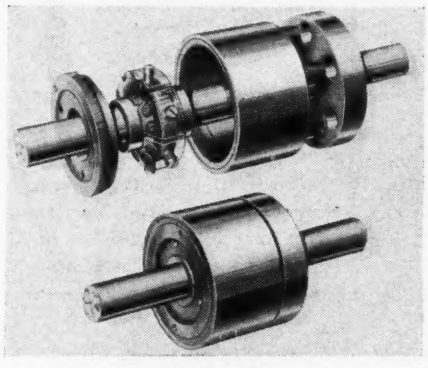


This new design of kneading machine is designed for intensive processing.

In this machine the gears, bearings and all rotating parts are totally inclosed and are automatically lubricated. The mixing chamber of the machine as shown in the illustration, is provided with a quick opening cover. Tiltable machines are equipped with motor or hydraulic operated dumping mechanisms. For vacuum service, a single outside stuffing box arrangement is used to maintain operating efficiencies and prevent contamination and require a minimum of attention for proper adjustment. The heavy duty units in the line embody improved stabilized-torque type of drive to balance uneven loading conditions. Various types and constructions of these new mixers are available for processing a wide range of materials.

Centrifugal Clutch

AMALGAMATED ENGINEERING & RESEARCH CORP., 100 West Monroe St., Chicago 3, has developed an automatically engaging and self-disengaging lubricated centrifugal clutch. Available in an unlimited range of sizes and capacities, this clutch can serve either as a coupling between shafts, as a driving pulley, or as a gear in a transmission. It also serves as a starting cushion between power units and driven mechanisms.



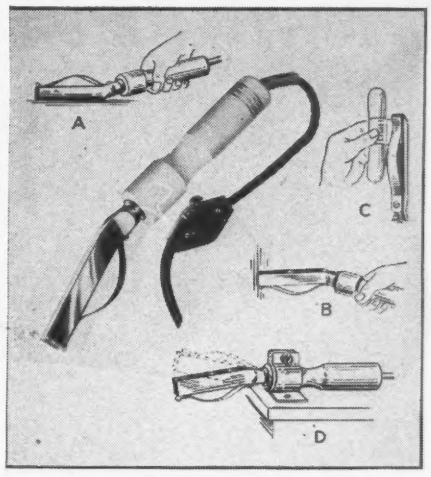
New centrifugal clutch in open and closed position.

The clutch is called the "Torkontrol" and consists of a partially filled oil chamber fitted with a freely rotating hub. This hub carries a series of movable wedge-shaped flyweights. As the hub revolves, these weights move outward and engage the internal rim of the outer case, binding the hub and the outer shell into a functionally solid pulley or coupling. The unit works well in either direction and is reversible. It can be set to engage or release at a given speed and to slip in case of overload. The manufacturer claims that this unit permits the use of smaller engines or motors which start without load, gives smooth cushioned application of power, and straight-line acceleration with resulting savings in operating cost.

Multi-Use Sealer

PACK-RITE MACHINES, 828 N. Broadway, Milwaukee, Wis., has developed a multi-use sealer for use in packaging problems involving heat sealing. The sealer comprises a heavy duty heating element and a three-way switch and connects to any 110-volt light socket.

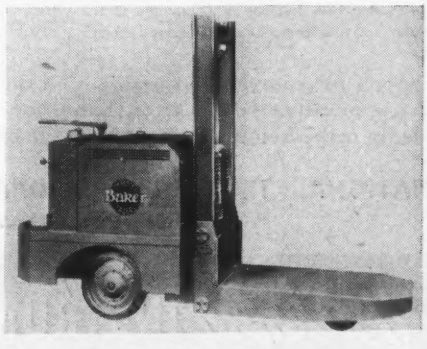
Three methods of operation are suggested as shown in the accompanying illustration: (A) where the flat back of the sealer is used on the top of bags, packages, labels, and so on; (B) where the flat heated tip of the sealer is used for spot sealing materials; and (C) where heat sealing materials are slipped under the spring clip as, for instance, in sealing label bands on sausage and similar materials, also for the tops of bags and envelopes. In addition, a table or wall clamp can be used as shown in D to securely hold the sealer in position on a work bench or table.



Multi-use sealer for heat sealing packaging materials, showing four different ways in which the device may be used.

High Lift Truck

BAKER INDUSTRIAL TRUCK DIVISION, Baker Raulang Co., 2168 W. 25th St., Cleveland 13, Ohio, has brought out a new 3-ton capacity high lift truck known as "Hy-Lift" type H3. This is an electric industrial truck built on a 66-in. wheelbase with an overall length of 123¾ in., and is designed for operation in intersecting aisles 67 in. wide. The maximum lift is 67 in. and the overall height is 83 in. The truck is equipped with a platform 26½x54 in. in area and the platform height in low position is 11 in.



High lift truck of 3-ton capacity.

Save Time in VITAMIN A Determinations

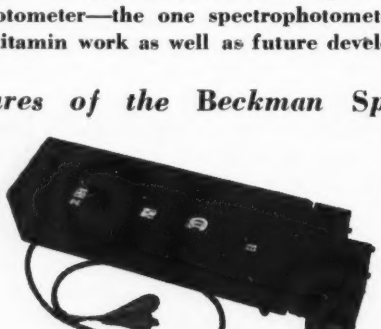
...Workers have indicated the ultraviolet absorption to be a more reliable index of Vitamin A content than antimony trichloride reaction with its attendant complications.
—Wilkie: U. S. Food & Drug Admin.

with the Beckman Spectrophotometer

The Beckman Spectrophotometer has already proved itself to be the fastest, simplest, and most accurate method for Vitamin A determinations. And, because the Beckman Instrument covers not only the visible and near ultraviolet, *but the complete range of ultraviolet* down to 220 mmu—this is the *only* spectrophotometer capable of handling ALL types of modern vitamin determination and control work!

Step up the speed, accuracy, and convenience of *your* vitamin work with the BECKMAN Spectrophotometer—the one spectrophotometer with *full range* to cover all present day vitamin work as well as future developmeent in this field!

Important Features of the Beckman Spectrophotometer



▶ **Entirely Self-Contained:** The monochromator, light sources, phototubes, and electrical measuring circuit are all incorporated within the instrument to insure maximum convenience ruggedness, and accuracy.

▶ **Easy to Operate:** Measurements are quick and simple to make. Direct readings in both % Transmission and Density can be made *simultaneously*.

▶ **Remarkably Versatile:** Interchangeable light sources, interchangeable phototubes, a monochromator with full range (220 mmu in the ultraviolet to 1000 mmu in the infrared) enable the instrument to meet all the varying requirements of research and control work with no sacrifice in convenience or accuracy.

▶ **Highly Accurate:** Although unusually simple to operate and remarkably versatile, the instrument is extremely accurate over the full scale, even with low light intensities. Stray light effects are less than 1/10 of 1% over most of spectral range.

▶ **Ruggedly Built:** Optical parts are rigidly mounted in a massive heat-treated iron block, within a hermetically sealed metal case. All parts are designed for long life and sustained accuracy.

Send for complete information on the Beckman Spectrophotometer. Describe the application you have in mind and our experienced engineering staff will gladly make helpful suggestions on the use of this instrument in *your* work.

NATIONAL TECHNICAL LABORATORIES, South Pasadena, Calif.
Beckman Instrument Division

Beckman INSTRUMENTS SPEED PRODUCTION ...REDUCE WASTE

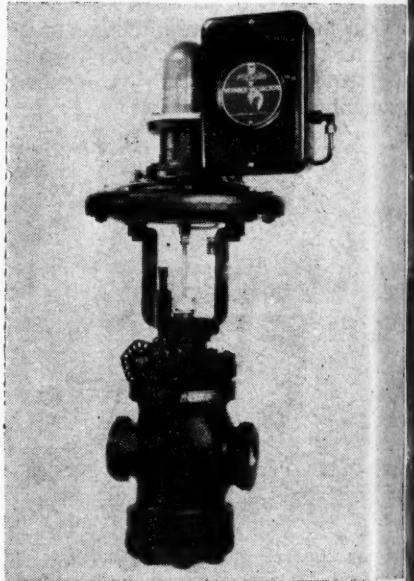
Floor Patching Material

WALTER MAGUIRE Co., 330 West 42nd St., New York 18, has brought out "Emeri-Crete," a material intended for use in filling cracks, small depressions, ruts and other imperfections and inequalities in concrete or cement floors. It is ready-mixed material that can be applied immediately after water has been added.

"Emeri-Crete" is composed of small particles of pure emery mixed with a special quick setting binder to permit the use of the floor within six or seven hours after the repair has been made. The material comes in small-sized packages in order to avoid the necessity of purchase of large quantities and to avoid waste of materials. The manufacturer states that the patches made from this material will not shrink, have high adhesive properties, and if applied in accordance with directions will make permanent repairs.

Micro-Positioner for Motor Valves

FOXBORO Co., Foxboro, Mass., has brought out a new design of its Vernier Valvactor. This is a micro-positioner



Improved design of micro-positioner for motor valves.

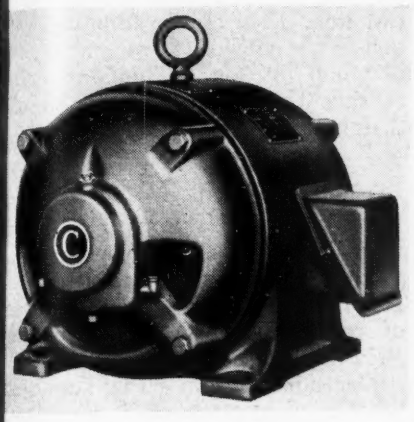
for pneumatic motor valves for use in connection with control instruments. It is used to insure precise and dependable valve response, especially where operating conditions may make the response uncertain, slow or unsatisfactory. It is actuated by air pressure; changes as slight as the equivalent of ½ in. of water can cause valve stem movements as small as 0.001 in.

Features claimed for this improved design are increased ease and range of adjustment, especially for duplexing and

sequencing; and a new snap action, for related service or step sequencing of valves or damper motors. Another improvement is more ease in reversal without change of parts or piping.

Protected Motors

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3, Mo., has brought out the Form J general purpose open rated line of motors in a new protected design in sizes from 1½ to 15 hp. In this motor the upper half of the end bracket is inclosed to minimize the possibility of dripping liquids or falling solids entering



General purpose open rated motors in a protected design.

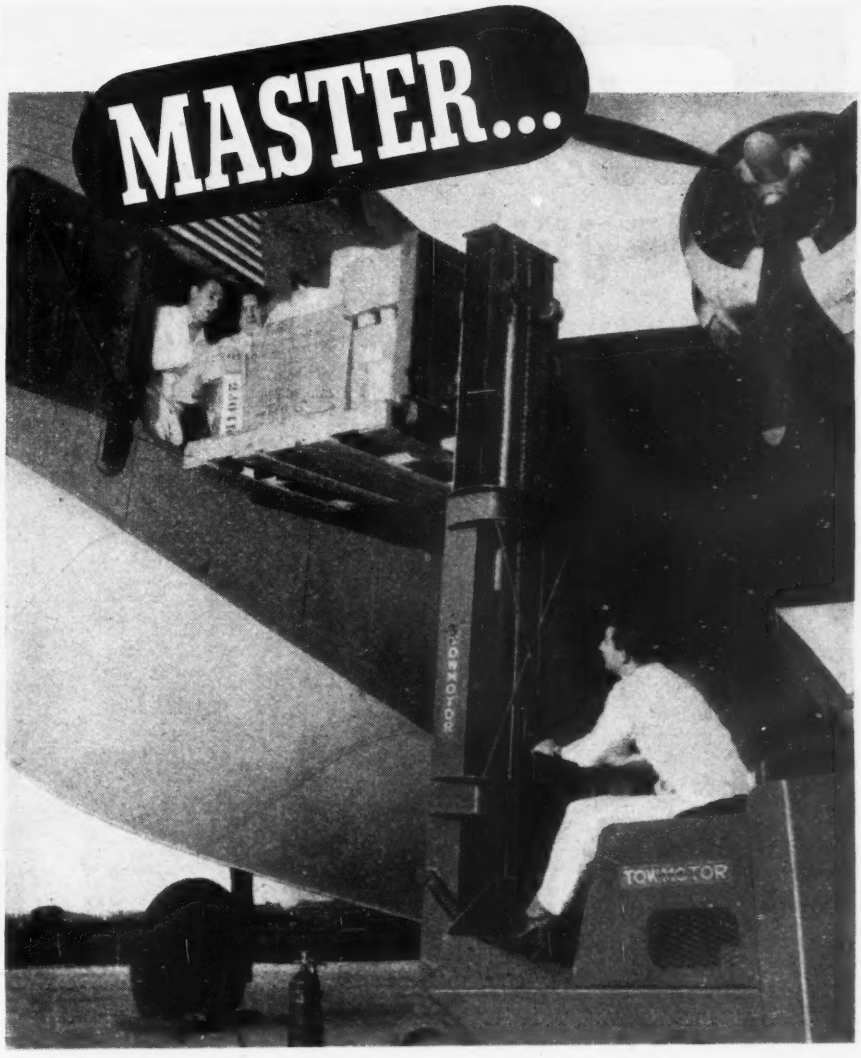
the vital parts of the motor. Fans are located behind the end bearing bracket to draw cooling air to the bearing bracket opening, around the bearings, across the winding and to the air passages between the outer surfaces of the magnet core and the frame. The heated air is expelled through openings at the side and bottom of the frame.

Pulsation Dampener

ASHCRAFT GAUGE DIVISION, Manning Maxwell & Moore, Inc., Bridgeport, Conn., is making Type 1106 pulsation dampener. This is a compact throttling device, particularly for use with pressure gages subject to severe pressure pulsations and rapid fluctuations, such as are encountered on reciprocating pumps. The dampener is suitable for all pressures up to 5,000 lb. per sq.in. and for any pressure medium such as air, water, oil or steam. It will eliminate excessive or harmful pointer vibration and save wear on the pressure gage mechanism. Also it enables easy reading of the mean steam pressure and helps to keep the gage in calibration.

Vertical Motors

A LINE of vertical high speed hollow shaft synchronous motors has been brought out by the Motor Division, General Electric Co., Schenectady,



of Materials Handling Situations!

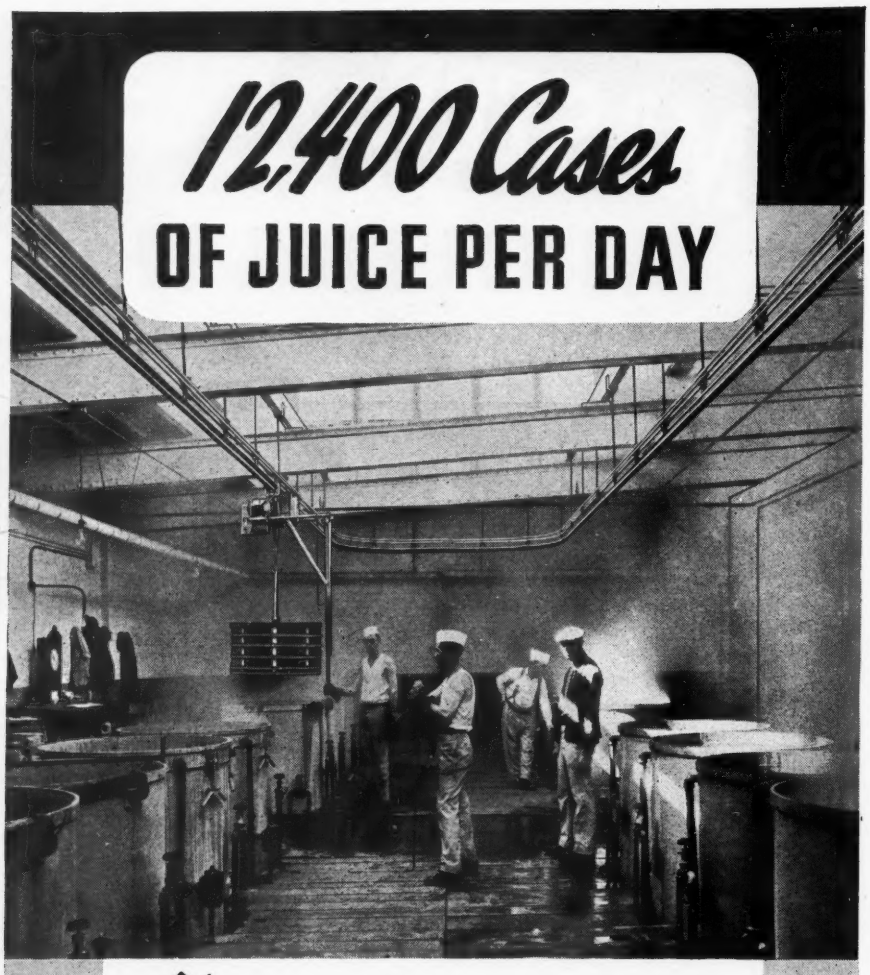
LOADING, unloading, moving or stacking . . . along the entire path of production, shipping and storing . . . Towmotor is the master of all materials handling situations, whether they be awkward, difficult or volume moving jobs!

Speed? Power? Rugged Towmotor has plenty of both in reserve! Yes, enough to move loads weighing as much as *10,000 pounds*, at speeds up to *880 feet per minute* and to stack or load them as high as *20 feet!* To these features, add extreme maneuverability, and you have the basic reasons why Towmotor effects such substantial savings in time, money, manpower and storage space.

All Towmotor details are available in Towmotor's "Data File." Write Towmotor Corporation, 1222 E. 152nd Street, Cleveland 10, Ohio for your *free* copy.

TOWMOTOR

THE 24-HOUR ONE-MAN-GANG



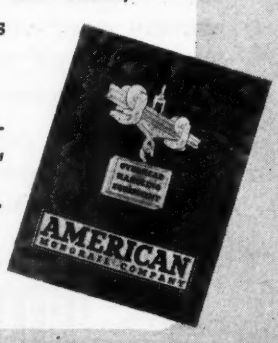
12,400 Cases OF JUICE PER DAY

Operating on two shifts this Midwestern company, specializing in tomato juice, has been producing 12,400 cases per day. American MonoRail Equipment plays an important part in this production... all manual handling and rehandling is eliminated and material moves on quick, accurate schedules. You, too, can speed up your production if American MonoRail Overhead Handling Equipment is on the job.

American MonoRail provides rapid, careful transfer from one operation to the other, from cooking and cooling process to piling of cartoned goods.

Let an American MonoRail Engineer show you "all round savings" with this equipment. Write today.

Send for Bulletin C—1. A 56 page book showing successful applications of American MonoRail systems.



THE AMERICAN MONORAIL CO.

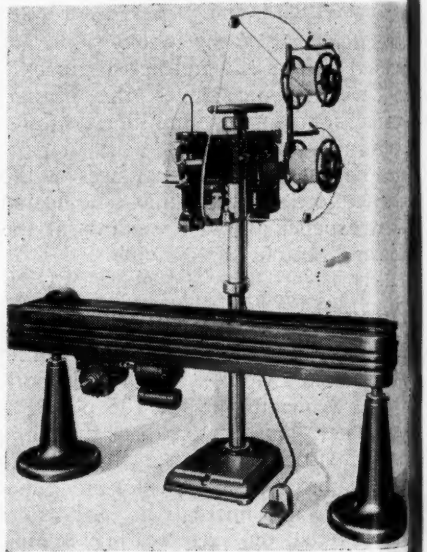
13125 Athens Avenue ★ Cleveland 7, Ohio

N. Y. Available in sizes from 100 t 1,000 hp. and in speeds from 514 t 1,800 revolutions per minute, thes motors are particularly designed fo pumping applications where large vo umes of liquid are being handled, a in water supply systems. For protection the motors have a drip proof inclosur and their outside contours are stream lined to prevent collection of dirt an dust. The top cover of the motor i designed for easy removal to permi adjustment of the pump shaft. Eas access to the brushes and collecto rings is obtained by removal of a flush mounted steel plate. Also, these motor are provided with frames made from cast iron. They can be furnished with non-reverse ratchets to prevent reversa of pump rotation at shutdown or on starting. They are also available in solid shaft construction.

Bag Closer

UNION SPECIAL MACHINE CO., 400 No. Franklin St., Chicago, is now making a column type high speed bag closer, style 20100P, which accommodates all types of sewing heads made by this company and can be used with any conveyor.

Depending on the sewing head used this bag closer produces (1) bound-over tape closure for all sizes of multi-wall



Column type high speed machine for closing bags.

paper bags; (2) straight sewed closure for all sizes of cloth or paper bags; or (3) "Dubl-Tape" sewed closure for paper bags up to 10-lb. size. Either one of two stitch types can be provided, that is, the single thread chain stitch for easy raveling, or the two thread double locked stitch for extra strong closures. The machine shown in the accompanying illustration is the Style 20100P pedal controlled power conveyor with a "60,000 C" sewing head.

DID YOU KNOW?

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supplies large quantities of

ADHESIVES & STARCH PRODUCTS

for the protective packaging of HUMAN BLOOD PLASMA.

for forming moisture-vapor-proof cartons for PLASTER OF PARIS (bone setting).

for waterproof labeling of vials, ampules, bottles, etc.

for sterilization-proof sealing of bandages, cotton, etc.

for sizing surgical gauze.

for promoting the growth of life-saving PENICILLIN.

for making & sealing envelopes of powdered sulfa drugs.

for labeling molded plastic containers of malaria preventive.

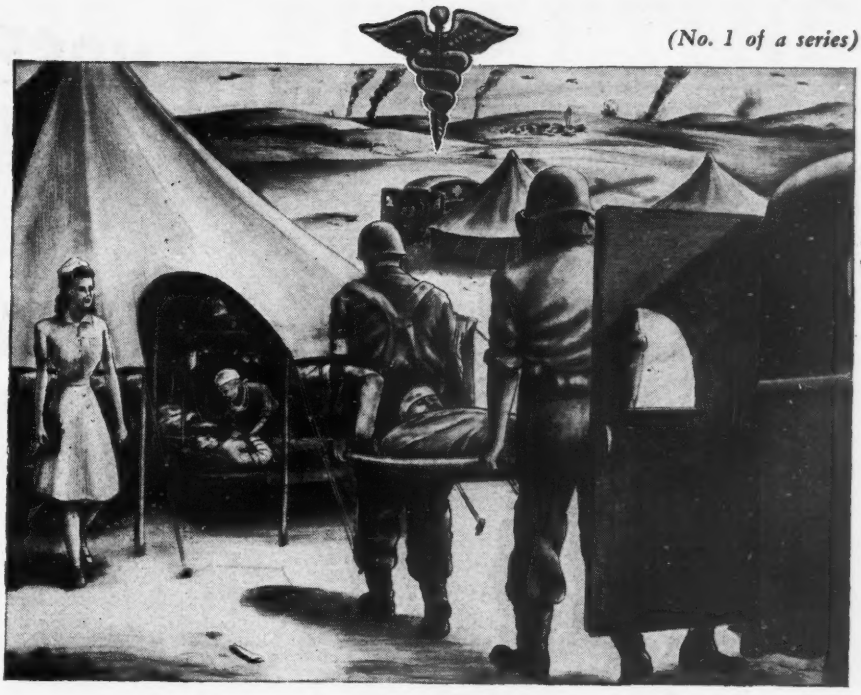
for molding sulfa, aspirin, and other tablets.

for sealing & labeling immersion-proof shipping cases and liners.

&

for many other purposes important to the MEDICAL DEPARTMENT in treating the wounded, comforting the sick, combating disease, strengthening the weak, and mending the broken of body or spirit.

(No. 1 of a series)



THE U. S. ARMY

MEDICAL DEPARTMENT

soothes PAIN . . . saves LIVES

ARMY doctors, nurses, ambulance drivers, stretcher bearers . . . with utter disregard for their own personal safety . . . work tirelessly to soothe pain and save lives on the battlefronts.

Medical Supply Officers here at home procure what is needed to carry on . . . under the most difficult of conditions . . . this great work of mercy.

National is proud of its record with the Medical Department . . . its humble contribution to the gigantic task of supplying field and base hospitals with life-saving medicaments . . . safely, efficiently, and on time.

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INCORPORATED

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NO TIME FOR "BROKEN NOSES" NOW!

PHOTO LIBBY-OWENS-FORD

That's a big bomber nose in the corrugated box. It's a mighty important piece of war goods, and its safe delivery stresses the vital role, war-time packaging is playing. Yes, on the unbroken chain of production, packaging and safe arrival depends the welfare of our armed forces.

Techniques developed in the engineering of war-time packages, that carry every type of war supplies to world-wide destinations, are carefully studied by H & D Package Engineers so that every possible packaging improvement will be in readiness for your post-war requirements.

Tomorrow's shipments will profit by today's packaging developments. Now is the time to plan post-war packaging. Rugged, dependable H & D corrugated boxes, designed by the authority on packaging, are the answer to shipshape, undamaged deliveries. Let H & D Package Engineers help you with your plans for post-war packages that protect and promote the product.

IF YOU CAN'T BUY TWO WAR BONDS PER MONTH—BUY ONE!

TELLS HOW TO SPECIFY CORRUGATED BOXES

Information on shipment size, weight, value, packaging, sealing, handling, and a question chart to easily determine the proper corrugated box to use, are clearly outlined in the H & D "Little Packaging Library" booklet, "How To Specify Corrugated Boxes."

This booklet as well as the 7 others that comprise the H & D "Little Packaging Library" can be had by writing The Hinde & Dauch Paper Company, Executive Offices, 4409 Decatur Street, Sandusky, Ohio.

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For postwar packaging . . better see **HINDE & DAUCH**

AUTHORITY ON PACKAGING . . . CORRUGATED SHIPPING BOXES

CATALOGS & BULLETINS

FOOD PLANT EQUIPMENT

Communication Systems—Four basic two-way, private or amplified communication systems for office, factory, institutional and military use are described and illustrated in a 4-page pamphlet issued by Executone Co., 415 Lexington Ave., New York 17.

Cold Plates—Specifications, installation details, photographs and diagrams of Dole vacuum cold plate evaporators used in refrigerated trucks, milk coolers, and frozen food locker plants are found in Catalog 23, Section 1, of Dole Refrigerating Co., 5910 N. Pulaski Road, Chicago 30.

Filters—Pictures, specifications and typical applications illustrating LeVal type filters, used by beverage manufacturers and in numerous filtration operations in food processing industries, have been published in Bulletin F-103 by Swenson Evaporator Co., Division of Whiting Corp., Harvey, Ill.

Heat Exchangers—Bulletin No. 432, a 6-page catalog illustrating Brown Fintube's improved type BFT-1 sectional hairpin heat exchanger, and including dimensions of standard sizes and performance data, has been published by Brown Fintube Co., 150 Filbert St., Elyria, Ohio.

Speed Reducers—"Saco" speed reducers of single and double reduction types for conveying, elevating, screening and transmission equipment, are illustrated by photographs and dimension drawings in Catalog 643 by Stephens-Adamson Mfg. Co., Aurora, Ill.

Turbine Pumps—Construction features and photographs of water and oil lubrication turbine pumps and various kinds of pump heads are found in Bulletin B-141 published by Peerless Pump Division, Food Machinery Corp., 301 W. Ave. 26, Los Angeles 31, Calif.

PLANT SUPPLIES

Expansion Joints—A 14-page illustrated bulletin, No. 35–15C, on "Adsco" piston-ring slip expansion joints for steam lines, which can be unpacked and repacked under full operating pressure, has been published by American District Steam Co., North Tonawanda, N. Y.

Rubber Equipment—For the safe and economical handling of acids, corrosives and similar materials, Flexite rubber pouring buckets, dippers, hard rubber funnels and Anode acid rubber gloves are described and illustrated in Catalog Section 9425 by B. F. Goodrich Co., Akron, Ohio.

Stainless Clad Steels—Information on analyses, applications, manufacture, fabrication, styles and standard size of sheets and plates are given in a booklet put out by Jessop Steel Co., 500 Greene St., Washington, Pa.

Valves and Pipe Fittings—Illustrations of numerous industrial applications of valves and fittings, and a feature article showing the use of valves in food dehydration, are published in *Walworth Today*, Vol. 6, No. 1, by Walworth Co., 60 E. 42nd St., New York.

CONTROL EQUIPMENT

Flow Meters—A 24-page two-section catalog, 98-Y, entitled "The Theory of the Rotameter" and "Rotameter Capacities and Correction Factors," containing technical and engineering data and diagrams of the Stabl-Vis Rotameter has been issued by Fischer & Porter Co., 925 County Line Rd., Hatboro, Pa.

Flowmeters and Controllers—Bristol recording flowmeters and flow controllers with a 20-, 50- or 100-in. meter body, and reset control system, are the subject of Bulletin F1601 by Bristol Co., Waterbury 91, Conn.

Gas Detectors—A 6-page illustrated pamphlet describing the operating principles of the Bristol combustible-gas detector, which measures the amount of combustible gas or vapor present in gas-air or vapor-air mixtures, has been issued by Bristol Co., Waterbury 91, Conn.

Instrument Panels—Rotameter instrument panels for test and control in flow rate measurements, complete with accessories and other instruments, Junior Rotameters for low-capacity service and Sanitary Rotameters are described in Bulletin 31-D issued by Fischer & Porter Co., 925 County Line Rd., Hatboro, Pa.

pH Recorders—For use in canning, blanching and brining processes, two Micromax pH recorder units which continuously and automatically indicate pH are described and illustrated in Catalog N-96(1) by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Recording Thermometers—Diagrams, photographs, recording charts, typical applications and principle of operation of recording thermometers, for temperatures between −125 and +1,000 deg. F., are found in Bulletin T800, a 40-page catalog published by Bristol Co., Waterbury 91, Conn.

Temperature Controls—Used to provide close and accurate temperature control in making and processing various products, Wheelco Potentiotrols are described, and four operating diagrams and a description of the potentiometer method of heat measurement are given, in Bulletin A2-3 issued by Wheelco Instrument Co., Harrison & Peoria Sts., Chicago 7.

MATERIALS HANDLING

Electric Car Spotters—For spotting railroad cars in factory yards and dragging heavy loads, vertical-capstan units of 5,000- and 10,000-lb. starting-pull capacity, mounted on a stationary foundation or equipped with a portable frame, are described and illustrated in Book 1992, issued by Link-Belt Co., 2410 W. 18th St., Chicago 8.

Industrial Trucks—Photographs, diagrams and detailed specifications of Yale "Standardized for War" electric industrial trucks, together with helpful illustrations of Yale trucks at work, have been published in a 75-page illustrated catalog by Yale & Towne Mfg. Co., Philadelphia Division, 4503 Tacony Ave., Philadelphia, Pa.

Industrial Trucks—Photographs, diagrams showing trucks, superstructures and casters for various kinds of materials-handling operations are found in a 64-page catalog, together with truck selection and engineering data, issued by Thomas Truck & Caster Co., Mississippi River & K St., Keokuk, Iowa.

Lift Truck Guide—To help both new and experienced lift truck operators, a 24-page "Lift Truck Operators Guide" describing basic methods of lift truck operation and emphasizing fast, efficient maneuvering as well as safe and time saving operating methods, has been issued by Towmotor Corp., 1225 E. 52nd St., Cleveland, Ohio.

MISCELLANEOUS

Controlled Materials Plan—A simplified explanation of the purposes, principles and procedures of the Controlled Materials Plan to assist in the proper identification of purchase orders and the application of the correct priority ratings, has been issued by Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

Corrugated Boxes—Factors affecting specifications of corrugated boxes under wartime conditions are discussed in a 20-page booklet, Little Packaging Library, No. 7, entitled, "How to Specify Corrugated Boxes," issued by Hinde & Dauch Paper Co., Sandusky, Ohio.

Fumigation—"Zyklon Discoids Fumigation Manual," a 50-page illustrated booklet describing various fumigating procedures and operations using Zyklon Discoids, disks containing hydrocyanic acid, has been published by American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York.

Locker Plants—The development of the refrigerated locker storage plant and a description of a modern 500-locker plant are given in a 14-page booklet, "The Modern Locker Plant," by Dole Refrigerating Co., 5910 N. Pulaski Road, Chicago 30.

Challenge to Government

(*Continued from page 55*)

Since relatively few canners had much of a labor problem in prewar years, they do not have facilities for housing and feeding large numbers of people. Neither do the small towns in which most canneries are located.

The Farm Security Administration has money available for transporting people and for housing and feeding them for agricultural work, but not for work in canneries, and this should be changed.

There is one source of manpower that could be the answer to our prayers, if we could only impress the importance of it on the high ranking Army officers. That is a few thousand of the hundreds of thousands of soldiers in hundreds of camps from coast to coast.

I know that this suggestion has not been well received. It is not what soldiers are trained for, and it would require modification of Army regulations —or it might even require remedial legislation—to secure soldiers, under their officers, with Army shelter and mess. But it has been done in such emergencies as flood and fire, as well as for rehabilitation work following a flood. Can anyone think of a more important emergency than the harvesting and processing perishable crops of vitally needed foods which would be lost without outside help?

And finally, why could not orders for our regulation be written in simple English that almost anyone could understand—as simple, for example, as the Ten Commandments—instead of in the highly involved, misleading, confusing, lengthy, incomprehensible form of the past, all gummed up with illusory certitude?

Cabinet Dehydraters

(*Continued from page 72*)

that the trays are held in slanting positions toward the air stream. If the trays are to be stacked one on top of the other, the wire-screen bottoms can be built into the parallel wood frames in slanting positions. It is doubtful if wooden slat-bottom trays could be used to an advantage in slanting positions.

In another type of cabinet dehydrater using a propeller fan, an entirely different method of air circulation is used, as illustrated in Fig. 4. The four-blade 36-in. propeller is mounted on one side of the cabinet directly behind a steam-heated fin-type coil. The air is forced through this coil as a pressure flow and then through a series of curved guide vanes at one end of the cabinet to make a 180-deg. turn. The air travels through one or more stacks of trays and then is turned back into the fan by means of another set of guide vanes. Intake and exhaust dampers are provided along with temperature-control instruments.

A small-capacity experimental dehydrater employing a centrifugal fan is shown in Fig. 5. In this unit, fresh air is drawn through the intake damper, heated by passing through the steam coil, picked up by the fan, turned horizontal to the duct turns, and blown parallel across the five trays as a pressure air flow. The wire cloth placed just ahead of the trays aids in the uniform distribution of the air. Temperature control and wet- and dry-bulb thermometers are mounted between this screen and the trays. Recirculation of the air is controlled by the two dampers. This dehydrater is particularly useful for experimental runs because of the accessibility of the material to sampling, and the assurance of uniform drying because of the one set of trays. This is necessary in determining drying curves by weighing the trays at intervals, because with two sets of trays, the product on the trays nearest the hot air flow may dry faster than the others.

Perhaps the most common type of cabinet dehydrater of the larger institutional size is one similar to the design in Fig. 6. This cabinet is equipped with two or three centrifugal fans mounted on a single shaft and propelled by one motor. The pressure air flow is forced through the fin-type steam coils and distributed through the trays by means of adjustable louvers or duct turns. Most cabinets of this design are illustrated without a means of distributing the air uniformly through the trays, but unless duct turns, baffles or louvers are provided on both ends of the cabinet, the tendency will be for most of the air to go through the bottom row of trays and some of it may actually backlash into the heater.

Some experimental work has been done on the use of vacuum cabinet dryers to dehydrate certain materials more rapidly than can be done with hot air and yet maintain the temperature lower than would correspond to the evaporation of water at atmospheric pressure. This type of dryer usually consists of a cast-iron shell containing a number of hollow shelves heated with steam, hot water or electricity. The material to be dried is spread on trays and placed on these shelves, the cabinet is closed, and a high vacuum applied by means of a vacuum pump. Heat is supplied to the shelves, which in turn heat the material in the trays to such a temperature that the water will evaporate under the existing pressure. The water vapor can be collected in a condenser located between the dryer and pump, or it may be drawn through a chamber containing a chemical absorbent. A vacuum dryer may be useful for the drying of valuable materials such as serum and blood plasma where the use of high temperatures would ruin the product, but under the present conditions this unit cannot be considered for the drying of vegetables on a commercial scale because of the need for additional critical equipment and the fact that the method is not continuous. Sometime in the future a continuous vacuum dehydrater may be developed capable of producing a superior product in a shorter length of time than is now required in the conventional tunnel dehydrater.

Some cabinet dehydraters have been built to utilize a so-called inert gas such as carbon dioxide or nitrogen, instead of air, as the drying medium. Drying in an atmosphere of inert gas would probably reduce the oxidation of food products during the dehydration period, but the process would possibly be too expensive and impractical for commercial practice. The cabinet would have to be gas-tight to prevent leaks, and the water vapor would have to be removed from the inert gas by passage through refrigerated coils, or through trays of a chemical absorbent. Considerable experimental work would be necessary before it could be stated that the added expense and equipment required by this system could be justified by any increase in the quality of the product.

Part II of this article—covering the preparation equipment, operating procedure, finishing and packaging, pilot-plant runs, multistage cabinet dehydraters, combination compartment and tunnel systems and the duplex cabinet system—will be published in February.—THE EDITORS.

Hormel Plans for Postwar

(*Continued from page 57*)

The actual mechanics of our method, outside of the simple structure of our organization, is referred to as the "project method." This is simply a method of outlining our objectives in a thorough and careful manner—in other words, a blueprint or road map as shown in Fig. 3. We feel that by such a method of orderly procedure our chances of obtaining the desired results are better. We find that when a person, a division or a department is required to outline their project as illustrated by this chart, their thinking and plans crystallize more quickly and in a more satisfactory, organized manner. When a project is written up in the prescribed form, copies are made for each member of the executive committee, which also serves to keep them informed and interested.

SO_2 Preserved Citrus Pulp

(*Continued from page 79*)

in the pulp was hydrolized and the "set" of the marmalade was too tender. When commercial pectin was added, the amount needed varied with each lot, and the quality of pectin in the pulp deteriorated rapidly when the pulp was held in the precook tanks at boiling temperature for as much as half hour. The sulphur dioxide was lowered from 4 to 15 p.p.m. by using the precook as well as the kettle cook, but the sliced peel became broken and the resulting marmalade was inferior to the batches made by placing the pulp (adjusted for solids) directly into the cooking kettles.

We also found that a very short cook gave a brighter and more desirable product. In no case did the sulphur dioxide average more than 30 p.p.m. After a week's run, the precook was discontinued and the pulp put directly into our cooking kettles.

Losses in Processing

Several improvements seem possible. There was a loss of 110,423 lb., or 16 percent, due to leakage, evaporation and soakage. This could largely be eliminated by coating the oak barrels with paraffine or other plastic material.

As the barrel hoops were very rusty when the fruit was received, material had leaked in on top of the pulp in many of the barrels. Spots of rust and dried-out pulp had to be skimmed from the surface of the pulp when the barrels were opened, and some worked into the pulp and got into the marmalade. The inspectors had rejects on the filling line due to spots. If the barrels had been coated with plastic or paraffine, the fruit pulp would have been cleaner, and loss of weight due to rust and direct pulp would have been eliminated.

The adjustment of weight due to correction for solids amounted to 10.4 percent for the grapefruit (average 8.25 percent instead of 9.1 percent) and 21.6 percent for the orange pulp (average 9.8 percent instead of 12.5 percent).

The overall loss in the pulp which we received was as follows: Net declared weight on barrels, 685,299 lb. Net weight as received and used, 574,876 lb. Net weight adjusted to standard solids, 498,792 lb.

The total loss due evaporation, leakage, and so forth, was much less for the orange pulp than in case of the grapefruit pulp, largely due, no doubt, to the fact that most of the orange pulp we used was packed in Baltimore, while all of the grapefruit was Florida packed. On the other hand, the loss due to adjusting the net weight to the standard 12.5 percent solids was much greater for the orange than for the grapefruit.

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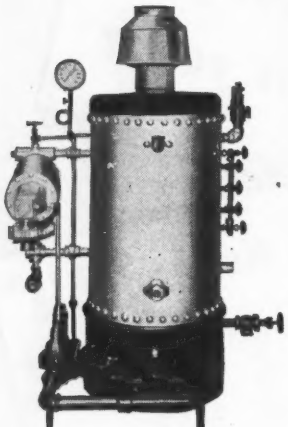

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Pectin Extraction

It seems likely that the pectin extraction would have been of better quality if no phosphoric acid had been used in the pulp as packed. The SO_2 should have been sufficient for pectin extraction as well as for the preservative effect. However, no experiments were made to substantiate this, and the statement is made on the basis of our experience with apple pomace extract.

Conclusion

This method of packing citrus pulp, its storage and processing, and the marketing of the product have proved successful. There is a possibility of a large consumer demand. We have had experience in cooperation between the government agencies, the original processors, the preservers and the established commercial outlets. And finally, the main purpose of giving the public a spread for the morning toast has been accomplished.

How To Maintain Motors

(*Continued from page 67*)

bind. Be sure, too, that the rabbets fits for the end-shields are clean.

Drying Wet Windings

Moisture is often the most destructive agent in limiting the life of motors. Where frequent hosing down is necessary or splashing of water is involved, or where the motors operate in an atmosphere filled with steam or excessive moisture, particular care is required. It is essential that the maintenance man know the steps necessary in drying out motors which become wet.

A motor should not be run if the windings have been thoroughly wet and a megohmmeter reading shows an appreciable drop in the insulation resistance. Applying operating voltage under such conditions will cause a winding failure. As few plants have motor baking ovens, the most effective alternative method is to take the motor apart and pass current through the stator windings. The applied voltage should not be more than one-fifth the nameplate voltage, which is sufficient to circulate the drying-out current. Thermometers should be placed on the stator during this internal baking process to be sure that the temperature of the winding does not exceed 90 deg. C.

Do not attempt to return the motor to service until a megohmmeter test indicates the winding to be at least in accordance with the AIEE rule which states that the insulation resistance of a motor at its operating temperature shall not be less than given by the formula:

$$\text{Megohms} = \frac{\text{Voltage at terminals}}{\frac{\text{Rating in kva.}}{100}} + 1{,}000$$

Motors which have seen extensive service and operate under tough conditions should be required to have an insulation resistance double this value.

If a motor has been completely submerged it is best to send it to a repair shop for a thorough baking out in an oven. It can afterwards be treated to make it moisture resisting by four to six dippings and bakings using a varnish which is impervious to moisture.

Where failures result from high ambient temperatures such as are found near ovens or heat-treating equipment or in boiler rooms, further failures may be prevented by having the stator wound with Class B insulation, where asbestos-covered wire and mica or glass-tape insulation are used.

Maintenance "Tools"

A megohmmeter is almost as important to the maintenance man as a stethoscope is to a doctor. For testing motor windings, locating faults in compensators and switches, for checking the condition of insulation in light and power circuits, this instrument is one of the most useful maintenance "tools."

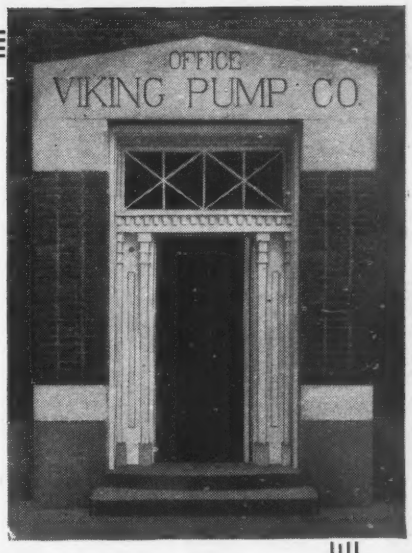
Hook-on volt-ammeter. This double-duty clamp-on type instrument is almost indispensable for general maintenance testing. A combination voltmeter and ammeter, it will indicate voltage on one setting and current on the other, without your having to open up lines or shut down motors to take readings. It has a wide range of voltage and current measurements without auxiliary equipment.

Portable recording ammeter. This instrument is valuable in detecting periods of overload on machines used for stirring, mixing, kneading or rolling, which, because of the variations in the density or viscosity of materials, might be subject to peaks or overloads, resulting in damage to the motor or the machine if not properly attended. A recording ammeter installed on such drives gives valuable information to both the machine operator and to the maintenance man.

Free Information

Another useful "tool" for maintenance is the literature available to the maintenance man. A considerable fund of experience has been accumulated by electrical manufacturers on the subject of apparatus maintenance, most of which will be supplied for the asking.

"Keeping persistently at it brings success," is the motto of a famous concern. This motto expresses equally well the primary rule of good motor maintenance.



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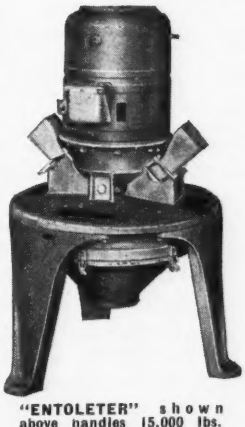

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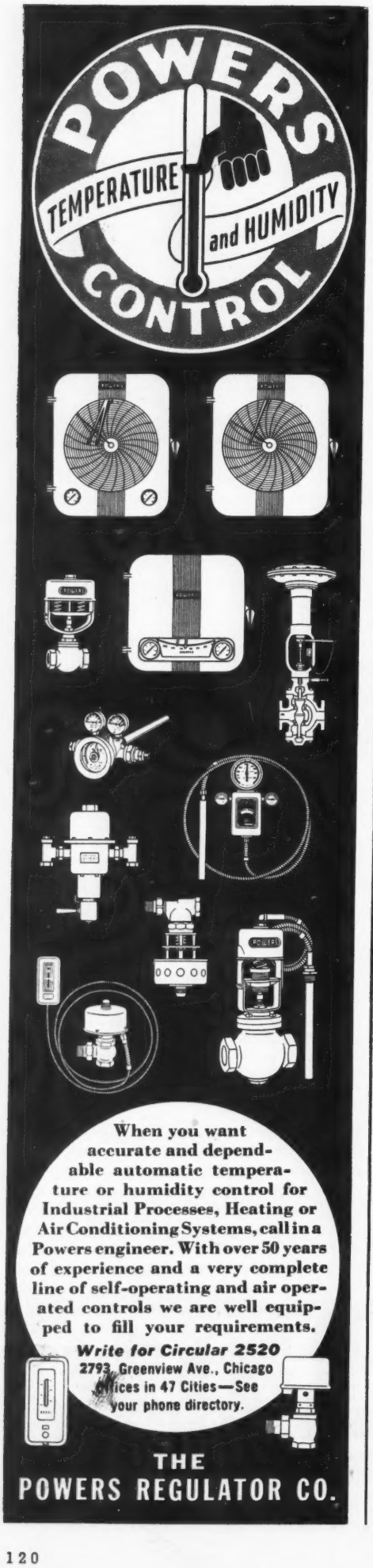
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BOOKS

Manual on Salvage

SALVAGE MANUAL FOR INDUSTRY. Published by the Salvage Division of the War Production Board, 1943. 243 pages; 5¾x9¼ in.; paper. Price, 50 cents; for sale by Superintendent of Documents, Government Printing Office, Washington, D. C.

While the primary function of this manual is to instruct men in industrial plants in regard to the best salvage methods and practices, the book serves two other purposes which will be valuable in the postwar period as well as under wartime conditions. By following the procedures outlined, valuable materials can be conserved, and more, plant operations can be made more efficient with consequent cost savings.

Contained in the manual is basic information for the individual who must set up a salvage program from "scratch" as well as technical information that can be used as a tool in detailed salvage procedures. Many salvage methods or practices are described throughout the manual, these serving as a guide where they may not be applied in a specific instance. Of particular interest is a table telling how to identify different kinds of metals. And a long list of hints on how to handle various items of scrap will be most useful.

The manual was prepared for general use in industry, and is not specifically for the food plant.

Technology of Fats, Oils

VEGETABLE FATS AND OILS. By George S. Jamieson. Published by Reinhold Publishing Corp., 330 West 42nd St., New York, N. Y. 1943. 508 pages; 6½x9¼ in.; cloth. Price, $6.75.

The chemistry and production of vegetable fats and oils and their utilization for edible, medicinal and technical purposes are discussed in this volume, now in its second edition. The methods in use for extraction of fats and oils are discussed in one chapter, but further attention is given to methods of expression under the production of individual products such as cottonseed, linseed and olive oils. And included in the pages on cottonseed oil are discussions of caustic soda refining, bleaching, deodorization, hydrogenation and the preparation and distillation of fatty acids recovered from refinery soap stock. And these methods are applicable as such, or with slight modification, to the treatment of a large number of fats and oils.

A wide range of information is given on the more important fats and oils. The part on olive oil, for example, covers the source, history, amount of production, harvesting, crushing and pressing, separation and clarification, filtration, refining, blending, uses, composition, characteristics, adulterants and tests. There is also an extensive bibliography.

This book contains a wealth of information useful to the technologist concerned with vegetable fats and oils. It is one of the American Chemical Society monograph series.

Dehydration Practices

COMMERCIAL DEHYDRATION. Published by the U. S. Department of Agriculture, Washington, D. C., 1943, as Miscellaneous publication No. 524. 29 pages; 5¾x9¼ in.; paper. Free.

A compilation of information supplied by the laboratories of the Agricultural Research Administration, the pamphlet covers all phases of commercial dehydration of fruits and vegetables in wartime in a very concise manner. It gives a quick, accurate overall picture of practices and problems from locating the plant to reconstituting the product.

Food Situation

FOOD FOR AMERICA. The Complete Proceedings of the National Food Conference of Consumers and Producers. Published by Gannett Newspapers, Rochester, N. Y., 1943. 203 pages; 6x9 in.; paper. Price, 50 cents.

Because 25 addresses on the current food situation were presented at the National Food Conference of Consumers and Producers, the proceedings of that conference are of interest to those who direct the operations of the food industries. This conference was held in Chicago in September, 1943, and on the program were addresses on the raw materials situation, processors problems, government regulation, subsidies, the consumer viewpoint, nutritional requirements and the food situation in South America.

Training Women

TRAINING WOMEN FOR WAR WORK. Published by the War Manpower Commission, Washington, D. C., 1943. 16 pages; 6x9 in.; paper. Free.

Here is a practical and timely little pamphlet discussing methods of training women to meet the wartime labor shortage in industry and giving suggestions for expediting the job. It explains training procedures developed during the past two years that not only are greatly increasing the efficiency of women workers but are encouraging them to remain on the job.

PATENTS

Plurality of Bread Doughs Mechanically Fed Into Baking Pans To Give Loaf of Laminated Structure—Laurence Seymour Harber, to Baker Perkins, Ltd., Peterborough, England. No. 2,332,315. Oct. 19, 1943.

Sliced Bread Loaves Mechanically Divided Into Halves Preparatory to Wrapping of Halves and Final Enclosing of Wrapped Halves in Single Overall Wrapper—Joseph Hexter and William E. Lanham, to Columbia Baking Co., Atlanta, Ga. No. 2,332,316. Oct. 19, 1943.

Starch Made Free of Thermophylic Bacteria by Chlorination With Minimum Thinning Effect—Ralph Waldo Kerr, Riverside, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,332,320. Oct. 19, 1943.

Starch Dextrinized by Dry Heat Treatment in Steam Jacketed Roaster—William J. Rowe and Carl Hagen, Chicago, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,332,345. Oct. 19, 1943.

Zein Extracted From Gluten Meal with Alcoholic Solvent at Elevated Temperature—Lloyd C. Swallen, Villa Park, and Martin L. Hamilton, Berwyn, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,332,356. Oct. 19, 1943.

Foods Frozen in Plate-type Unit After Wetting Contact Surfaces With Refrigerating Liquid Having Temperature Lower Than That of Food Being Frozen and Higher Than That of Refrigerated Surface—Clarence Birdseye, Gloucester, Mass., to Mechanical Research, Inc., Providence, R. I. No. 2,332,367. Oct. 19, 1943.

Prepared Mix Made to Contain Flour and Solid Expanded Cellular Mixture of Corn Sirup and Shortening—Wilbert A. Heyman, to Granular Foods, Inc., New York, N. Y. No. 2,332,513. Oct. 26, 1943.

Casein in Solution Containing Formaldehyde Treated With Urea to Form Resin Product—Carl S. Leonardson and Donald J. White, Seattle, Wash., to Borden Co., New York, N. Y. No. 2,332,519. Oct. 26, 1943.

Riboflavin Alkali Metal Salt Reacted With Alkali Metal Borate to Form Double Salt—Morris Eli Auerbach, Albany, N. Y., to Winthrop Chemical Co., Inc., New York, N. Y. No. 2,332,548. Oct. 26, 1943.

Frozen Foods Packaged in Specially Designed Slip-cover Cans—Edward L. Benedict, to Crown Can Co., Philadelphia, Pa. No. 2,332,553. Oct. 26, 1943.

Sugar Acetylated to Form 1-N-Tetraacetyl-d-ribityl-amino-2-phenylazo-4. 5-dimethylbenzene—Richard Pasternack, Islip, and Ellis Vincent Brown, Cold Spring Harbor, N. Y., to Charles Pfizer & Co., Brooklyn, N. Y. No. 2,332,666. Oct. 26, 1943.

Beverage Dry Mix With Water-soluble and Substantially Nonhygroscopic Properties Made to Contain Citric, Tartaric and Malic Acids and Their Acid Salts and Relatively Water-insoluble Acid Phosphate to Give Relatively Mild Tart Taste to Finished Beverage—Frank H. Lyons, to Clyde Collins, Inc., Memphis, Tenn. No. 2,332,735. Oct. 26, 1943.

Starch Converted With Acid to Produce Large Proportion of Reducing Sugar With Abnormally Low Ash Content—Herman H. Schopmeyer, Hammond, Ind., and Abraham H. Goodman, Chicago, Ill., to American Maize-Products Co. No. 2,332,758. Oct. 26, 1943.

Vegetable Protein Solution Containing Formaldehyde Heat Treated With Urea to Give Water-soluble Resin—Carl S. Leonardson and Donald J. White, Seattle, Wash., to Borden Co., New York, N. Y. No. 2,332,801. Oct. 26, 1943.

Animal Protein Solution Containing Formaldehyde Heat Treated With Urea to Form Water-soluble Resin—Carl S. Leonardson and Donald J. White, Seattle, Wash., to Borden Co., New York, N. Y. No. 2,332,802. Oct. 26, 1943.

Waste Waters From Beet Sugar Manufacture Clarified for Reuse in Diffusion Process—Teodor Wintzell, Malmo, and Nils Tore Lauritz, Lauritzson, Trelleborg, Sweden. No. 2,332,823. Oct. 26, 1943.

Precooked Breakfast Cereal Made From Wheat Without Toasting or Puffing—Frank James, Normandy, Clifton A. Cobb, University City, and Lamar Kishlar, Webster Groves, Mo., to Ralston Purina Co., St. Louis, Mo. No. 2,332,914. Oct. 26, 1943.

Dry Powdered Coffee Extract Made to Contain Approximately 85 Percent of Fat in Original Liquid Coffee Extract—Max Rudolf Morgenthaler, Vevey, Switzerland, to Inredeco, Inc., Panama City, Panama. No. 2,333,027. Oct. 26, 1943.

Fruit Juices Freed From Seed Content on Continuous Basis in Atmsophere of Inert Gas—Ronald B. McKinnis, to McKinnis Foods, Winter Haven, Fla. No. 2,333,190. Nov. 2, 1943.

Corn Sirup Desiccated by Spray Drying—David D. Peebles, Berkeley and Paul D. V. Manning, Berkeley Woods, Calif., to Golden State Co., Ltd., San Francisco, Calif., No. 2,333,333. Nov. 2, 1943.

Puffed Cereals Given Candy Coating Without Forming Conglomerate Masses—James S. Rex, to Ranger Joe, Inc., Chester, Pa. No. 2,333,442. Nov. 2, 1943.

Spices Sterilized and Preserved by Smoking—Hugh E. Allen, Northbrook, Ill., one-half to Albert G. McCaleb, Evanston, Ill. No. 2,333,505. Nov. 2, 1943.

Liquids in Containers Pasteurized During Passage Through Heating Chamber on Endless Conveyor—George J. Meyer, to Geo. J. Meyer Manufacturing Co., Cudahy, Wis. No. 2,333,544. No. 2, 1943.

String Beans Mechanically Oriented Into Lengthwise Path of Travel Preparatory to Further Mechanical Treatment—Charles E. Keer, Hoopeston, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,333,576. Nov. 2, 1943.

Dehydrated Molasses Packaged While Hot in Moistureproof Bag—Lyman Chalkley, Point Pleasant, N. J., to Government of the United States. No. 2,333,638. Nov. 9, 1943.

Fats and Oils Stabilized by Addition of Small Amount of Ascorbic Acid and of Small Amounts of Tocopherol-type Compound—Henry A. Mattill and Calvin Golumbic, Iowa City, Ia., to Lever Bros., Cambridge, Mass. No. 2,333,655. Nov. 9, 1943.

Fats and Oils Stabilized by Addition of Small Quantities of Naphthols, Quinones, or Quinol Compounds; Small Amount of Ascorbic Acid; and Small Amount of Vitamin E Precursor Compound—Henry A. Mattill and Calvin Golumbic, Iowa City, Iowa, to Lever Bros. Co., Cambridge, Mass. No. 2,333,656. Nov. 9, 1943.

Fats and Oils Stabilized by Addition of Small Amount of Caffeic Acid—Henry A. Mattill and Calvin Golumbic, Iowa City, Iowa, to Lever Bros. Co., Cambridge, Mass. No. 2,333,657. Nov. 9, 1943.

Fats and Oils Stabilized by Addition of Small Amounts of Hexuronic Acid and Cyclic Oxy Compound—Henry A. Mattill and Calvin Golumbic, Iowa City, Iowa, to Lever Bros. Co., Cambridge, Mass. No. 2,333,658. Nov. 9, 1943.

Canadian Patents

Food Given Aromatic Flavor and Aroma by Addition of Stable, Substantially Nonvolatile, non-oxidizable Constituent of Volatile Oil—Roland E. Kremers, Summit, N. J., to General Foods Corp., New York, N. Y. Nos. 416,156; 416,157, and 416,158. Nov. 2, 1943.

Eggs Graded for Weight by Mechanical Means—Robert C. Sneed, Piedmont, and Curtis Sheldon Jordon, Glendale, Calif., to Safeway Stores, Inc., Oakland, Calif. No. 416,181. Nov. 2, 1943.

Fish Oil Recovered From Press Liquor—Herbert Hempel, Essex, Mass., to Gorton-Pew Fisheries Co., Ltd., Gloucester, Mass. No. 416,459. Nov. 16, 1943.

Vegetables and Like Washed in Unit Containing Bottom Plate Rotatable Inside Stationary Drum—William Heywood Haslam, to Fisadco, Ltd., London, England. No. 416,578. Nov. 23, 1943.

"Tortoise Salt" vs "Hare Salt"

ONE OF OUR most difficult problems in selling Diamond Crystal Salt is the apathy of food technologists and salt buyers toward salt. Too often they say, "Oh, well, salt is salt."

Take solubility: In salting butter, salt must dissolve with lightning speed. If the butter fat is on the soft side—lacking in body—at certain seasons, butter salt must dissolve so quickly that overworking is avoided. Otherwise, the butter may lose its desirable physical properties and become mottled or marbled—and may lose its moisture, become leaky. Yet, if the salt is not properly dissolved, the butter may be gritty. On the other hand, in salting cheese, slow solubility of salt is highly important. Otherwise, salt is lost in whey, producing undersalted cheese.

To meet these problems, we have set up definite solubility standards for Diamond Crystal Salt. Our Diamond Crystal Butter Salt, for example, dissolves completely in water at 65° F. in less than 9.8 seconds—average rate, 9.2 seconds. Quality-minded food processors can depend on Diamond Crystal products, manufactured under strict quality-control standards for solubility rate.

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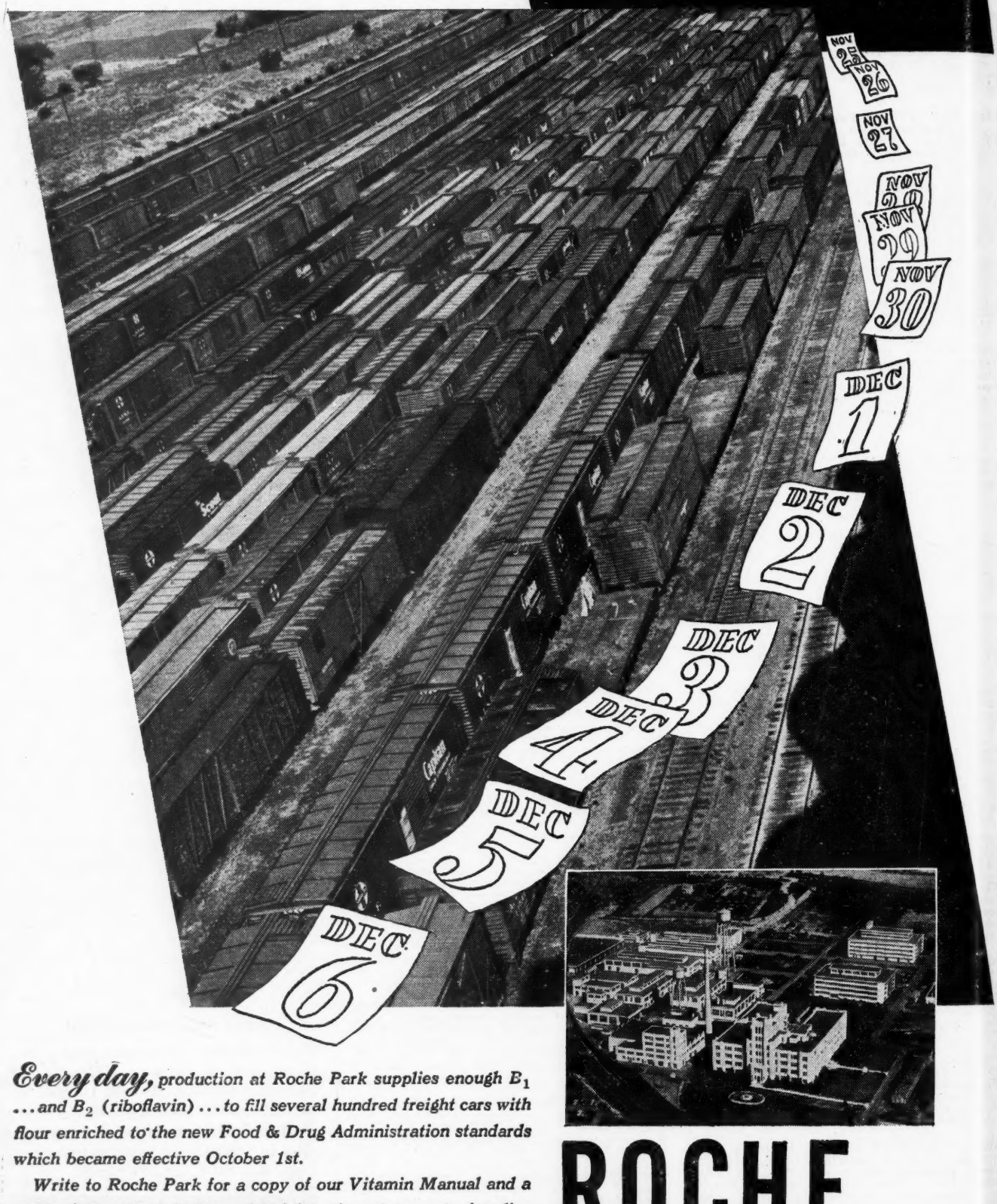

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

QUALITY CONTROL

Moisture Determination

CHANGES in electrical resistance of the material, the loss of weight on oven drying, and direct recovery of moisture by distillation, are used for moisture determination in foods.

For factory control the electrical resistance method is satisfactory on substances which form a paste when disintegrated. Charts are needed for each type of fruit at comparable stages of ripeness.

For oven drying the temperature must be as low as possible, to minimize decomposition, and the time must be specified, since even at low temperatures a slow but steady decomposition does occur. Tests made with a mechanical convection-type oven, giving a variation in shelf temperature of less than 1 deg. C., indicated that for dried fruit concordant results are obtained at 98 deg. C. for 3 hours. Apples may be run at higher temperature, up to 110 deg. C. Samples must be finely chopped and then preferably made into pellets of uniform size.

With dried vegetables as much as 97 percent of the moisture is driven off in the first hour. Potatoes give up moisture slowly and the sample should have a large proportion ground to pass through 30 mesh, all the fines being retained. A temperature between 115 and 130 deg. C. is desirable. Onions decompose readily, and should not be heated above 105 deg. C. for 1½ hours. As large a sample as possible should be used for onions, or several check samples, because of the variation in composition. For cabbage, which also decomposes readily with heat, 105 deg. C. for 2 hours gave a satisfactory test. Cereals and dry biscuits, ground to pass 20 mesh, require only 1 hour, at a temperature of 130 deg. C.

For the precise moisture determination a close temperature differential must be maintained. Atmospheric ovens that have no provision for mechanical convection are unsuitable. Construction and operational technic for vacuum ovens must be standardized and rigidly adhered to, to give identical results.

Distillation tests with toluol indicate that water-soluble decomposition products are distilled off before caramelization takes place. Corrections can not be applied for this decomposition, since its nature and extent are not known. Recommended practice for the Dean and Stark distillation includes use of standard apparatus with fitted ground-glass joints; a petroleum fraction extractant having a steady boiling point of 105 to 110 deg. C. under reflux conditions; use of a thin layer of sand on the bottom of the flask for very moist, slimy or plastic material, to prevent charring; and great care to insure uniform heating. Material must be finely and uniformly divided. Potatoes and cereals must be ground to show a high percentage through a 30 mesh sieve, while meat must be chopped three times. Distillation must be stopped as soon as a reasonably low rate of recovery is reached, which should be in about 1 hour for apples, 1¾ hours for all other fruits, 1 hour for meats and spices, 1¾ hours for cereals and 2 hours for sauces and jams.

Digest from "The Determination of Moisture in Foods," by C. R. Churchward, *The Australian Chemical Institute Journal & Proceedings*, vol. 10, 68-82, March, 1943.

FATS AND OILS

Method for Determination Of Incipient Rancidity

COLORIMETRIC determination of the presence of peroxides is a truer index of the amount of oxygen absorbed by the fat than are the results of iodometric titrations. The colorimetric method indicates the presence of the peroxides at an earlier stage of rancidity. The method is based on the use of a solution of 0.1 percent ferrous ammonium sulphate and 0.4 percent ammonium thiocyanate in 96 percent acetone.

The method was developed to determine fat-peroxides in whole milk powder, and subsequently was modified for use in the development of antioxidants for lards and shortenings. Hydroquinone and α-tocopherol do not interfere when added to the fat in amounts up to 0.1 percent. Citric acid and some other substances markedly reduce the color of ferric thiocyanate solutions, but citric acid may be present in the fat in amounts up to 250 parts per million without affecting the test. Acetic acid added to the reagent will eliminate the effect of larger amounts of citric acid than this.

Peroxide values of fats after storage, as measured by this colorimetric method, are of the same order of magnitude as the difference in stability time in the modified Swift stability test. So a determination of the initial peroxide value of the sample by the colorimetric method may be a criterion of its keeping quality, and the test might be employed for grading samples.

Digest from "The Application of the Ferric Thiocyanate Method to the Determination of Incipient Rancidity in Fats and Oils," by A. Lips, R. A. Chapman and W. D. McFarlane, *Oil & Soap*, vol. 20, 240-43, November, 1943.

Substitute Cocoa Butter

VEGETABLE butters are characterized by a very short plastic range. The type and relative proportions of the fatty acids of cocoa butter are not greatly different from those of the hard animal fats, the difference in behavior being due to the manner in which saturated and unsaturated fatty acids are grouped in the glyceride molecules.

Hydrogenation of an ordinary vegetable oil may be controlled to produce a limited quantity of saturated acids, but there is no means known at present for repressing the formation of saturated glycerides. Fully saturated glycerides can be removed by solvent crystallization, however, and selective hydrogenation followed by fractional crystallization has produced from cottonseed oil a hard butter very similar to cocoa butter.

Physical differences between this fat and the cocoa butter are minor. The new fat has a slightly longer plastic range, supercools less strongly and contracts slightly less upon solidification. The chemical composition is somewhat different, due to the presence of iso-oleic acids. Yields are low, but the residue is suitable for use as a hardening agent in shortening and similar products.

Digest from "Modification of Vegetable Oils. II. A Cocoa Butter Substitute from Cottonseed Oil," by E. A. Kraemer, B. A. Smith and A. E. Bailey, *Oil & Soap*, vol. 20, 235-40, November, 1943.

CANNING

Nickel-Tin Coatings

THIN nickel-tin coatings are indicated as suitable to replace heavier tin coatings in cans for a considerable range of foods. Laboratory tests were made by measuring the galvanic potential between the coating and bare steel. Five canned foodstuffs—dried prunes in sirup, sauerkraut, tomatoes, spinach and peas—were selected as typical of the corrosive conditions encountered in cans. Anaerobic conditions were main-

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tained in the test cells, and readings were made without disturbing the contents.

This type of test was selected to give results more quickly than the multiple experimental food packs. Coatings which are not broken down in 200 days are considered sufficiently resistant to corrosion to be commercially interesting.

For these tests the tin-nickel coatings were obtained by plating first nickel and then an equal thickness of tin on the steel, and heating at 575 deg. F. for 6 to 8 minutes. It is recommended that the coating be formed by plating both metals simultaneously, as has been done experimentally. Coatings 0.00006 in. thick appear to be satisfactory.

Digest from "Corrosion of Tin-Nickel Alloy Coatings on Steel in Canned Foodstuffs," by H. R. Copson and W. A. Wesley, Paper presented at the General Meeting of The Electrochemical Society, Oct. 15, 1943, Preprint No. 84-23.

FORTIFICATION

Vitamin Stability

RATE OF LOSS of a vitamin is independent of the starting level, hence the absolute loss is higher at higher initial concentrations. The rate of loss under the storage conditions expected must be considered in selecting foods for fortification.

Fats protected against the development of rancidity usually hold carotene and vitamin A well. Carriers for the B vitamins, heretofore considered to offer no problem, must be reexamined for stability at high storage temperatures. Carriers for ascorbic acid are quite scarce, but the lemonade powder of the Army combat rations has undergone 22 weeks' storage at 120 deg. F. without serious loss of potency.

Reaction mechanisms in vitamin loss are at present uncertain. It is generally recognized that breakdown is hastened by heat, light, moisture, oxygen and increased surface; that most water-soluble vitamins are stabilized by slightly acid media but adversely affected by alkali; and that fat-soluble vitamins are resistant to alkaline but not acid conditions.

The vitamin loss appears to obey the general rule of doubling the reaction velocity for a rise in temperature of 18 deg. F., but it can not be assumed that storage for a short time at high temperature is equivalent to storage for a definite longer time at a lower temperature. Storage tests should be made in parallel at a high and a lower temperature (for instance, at 100 deg. F. or above and at normal temperature). Tests of less than a month's duration at any temperature are not considered very informative for Army purposes. If vitamin deficiencies resulting from storage are to be corrected by fortification, the fortified foods must be stable under conditions in which other foods are not. Careful selection of the foods to be fortified and of the fortifying agents, as well as thorough testing of the fortified product, must precede adoption of any fortified food for Army use.

Digest from "Vitamin Fortification and the Stability of Vitamins in Foods," by V. O. Wodicka, 1943 *Proceedings, Institute of Food Technologists*, 28-33.

Changes in Fruit Juice During Storage

DATA on changes in color and ascorbic acid content during storage of deaerated and pasteurized juices from highly pigmented small fruits indicate the possibility that a reaction occurs between the pigments and the ascorbic acid. This would explain the loss of color in the juice and the decrease of ascorbic acid content. The pigments are known to be reducible and ascorbic acid is oxidizable. It was found that increasing the concentration of ascorbic acid or its isomer increased the rate of change of color as well as the rate of loss of the vitamin.

Digest from "Changes Occurring in Fruit Juices During Storage," by H. G. Beattie, K. A. Wheeler and C. S. Pederson, *Food Research*, vol. 8, 395-404, September-October, 1943.

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DEHYDRATION

Experimental Spray Drier

DESIGN of a laboratory spray drier which has been used to produce excellent quality dried milk, egg and Irish moss is reported. This is a cyclone drier with a 2-ft.-diameter drying chamber 14 in. high and a collecting cone 4 ft. high. The capacity is about 1 gal. per hour of liquid. The maximum air volume is approximately 90 cu. ft. per minute. Glass windows in the top of the chamber permit inspection during operation.

The inlet air temperature is thermostatically controlled to within 2 deg. F. (plus or minus one degree). The inlet and outlet air temperatures and those at three points down the side of the cone are measured, also the static pressures on the inlet and outlet air. The spray nozzle uses a compressed air atomizer at pressures which may be varied from 5 to 25 lb. per square inch. Liquid and air orifices may be varied independently.

The unit can be used to give general trends of the factors affecting drying efficiency and quality of product, although there are inherent differences from results of actual plant operation.

Digest from "A Laboratory Spray Drier," by A. H. Woodcock and H. Tessier, *Canadian Journal of Research*, vol. 21, 75-78, September, 1943.

STORAGE

Poultry Freezing

A PATENT has been issued which covers the steps of chilling freshly killed poultry with a refrigerant spray, reducing the internal temperature below 50 deg. F. in a very short time (15 to 30 minutes) then holding it between 32 and 40 deg. F. for at least four hours before quick freezing.

The prompt cooling prevents flavor deterioration and development of undesirable flavors, while the holding period avoids the toughness which results when poultry is frozen before the period of rigor mortis has passed.

Digest of U. S. Patent 2,329,226, issued Sept. 14, 1943, to E. Stafford and C. H. Welling, and assigned to Z Pack Corp., Boston, Mass.

Residual Bromide

SAMPLES of methyl bromide fumigated wheat and other cereals, representing actual commercial practice, have been analyzed for residual bromine.

The four common methods are fumigation of mills and warehouses as a whole, generally at a dosage of 1 to 2 lb. of methyl bromide per 1,000 cu.ft. of space, fumigation of infested products or containers in vaults of various sizes, stacking and fumigation of mate-

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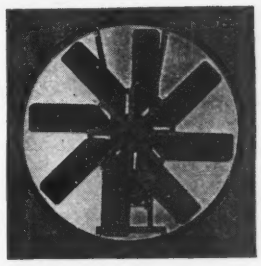

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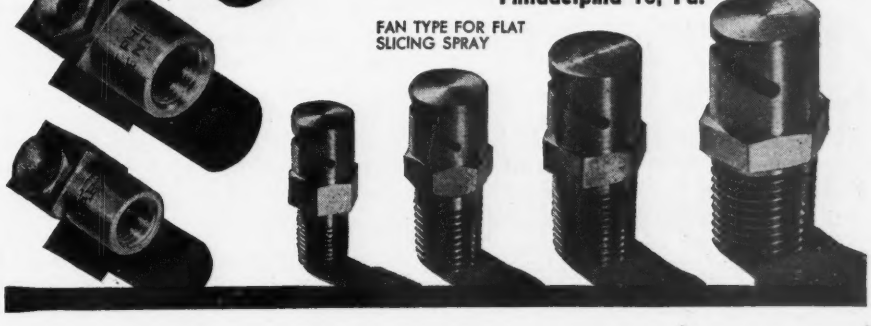

rial under tarpaulins, and fumigation in boxcars.

Mill fumigation of white flour resulted in an increase, after 24 hours, which in no case amounted to more than 26 p.p.m., with a total bromine ranging from 32 to 44 p.p.m. after fumigation. This treatment had resulted in a kill of insects of better than 99 percent.

Vacuum vault fumigation of oatmeal gave retentions as high as 247 p.p.m. Wheat germ meal retained up to 122 p.p.m. when subjected to atmospheric vault fumigation for 12 hours, then standing 24 hours. Fumigation under tarpaulin, with a dosage of 4.5 oz. per ton, increased the total bromine of wheat flour to 99 p.p.m., and a dosage of 3.2 oz. per ton increased the bromine of mung beans from 37 to 80 p.p.m.

Wheat in a boxcar, treated with 3.2 oz. of methyl bromide per ton and then in transit for 3 days at an average temperature of approximately 90 deg. F., was found on arrival to contain 62 p.p.m. of bromine. Four weeks later this was reduced only slightly, to 60 p.p.m. and storage for another week did not effect any further reduction.

Digest from "Bromine Residues from Methyl Bromide Fumigation of Cereal Products," by H. D. Young, R. H. Carter and S. B. Soloway, *Cereal Chemistry*, vol. 20, 572-78, September, 1943.

DAIRY PRODUCTS

Cheese from Acid Milk

WEAK body in Cheddar cheese was corrected by the addition of 0.05 percent of calcium chloride ($CaCl_2 \cdot 2H_2O$), to the milk before pasteurization. The milk used in the particular plant involved was two to four days old as received, and was slightly sour before pasteurization, the average being 0.17 to 0.19 percent acidity. Experimental batches of cheese made from milk in which a slight acidity was developed prior to pasteurization indicated a greater retention of moisture in the cheese than in that made from normal milk.

Digest of "Difficulties Encountered in Pasteurizing High Acid Milk for Cheesemaking," by S. T. Coulter and W. B. Combs, Paper presented before the Thirty-Eighth Annual Meeting of the American Dairy Science Association, *Journal of Dairy Science*, vol. 26, 771, August, 1943.

Milk Storage

ACCORDING to Connecticut records covering more than a year, alternate day delivery of milk has been adopted without causing serious health problems.

Since bacterial numbers increase geometrically with time, a low initial bacterial count is very important for milk which is not to be used immediately. With reasonably low counts on delivery, ice boxes will provide adequate protection for storage for two days, and in a mechanical refrigerator with low temperature the product should not develop inordinately high counts during three or four days' storage.

Alternate day delivery should not be attempted during hot-weather months, in markets where a considerable portion of the homes do not have refrigerators.

Digest from "Efficiency of Milk Marketing in Connecticut, 5. Economics and Biology of Alternate-Day Milk Delivery," by R. G. Bressler, Jr., E. O. Anderson, D. A. Clark, Jr., and E. N. Bilenker, *Storrs Agricultural Experiment Station, Bulletin* No. 247, May, 1943. (Storrs, Conn.)

MEATS

Thiamine in Canned Pork

Loss of vitamin B_1 from canned pork during retorting for 200 minutes at 230 deg. F. was found to lie in the range from 42 to 55 percent. Thiamine hydrochloride crystals added during the mixing operation do not undergo any greater percentage loss, and it is possible to produce canned luncheon meat with a vitamin B_1 content as high or higher than that of the original pork. Lean pork muscle has been shown to be a richer source of this food factor than beef, veal or poultry.

No data are presented showing vitamin loss during storage.

Digest from "The Vitamin B_1 Content of Canned Pork," by E. J. Reedman and L. Buckby, *Canadian Journal of Research*, vol. 21, 261-66, August, 1943.

MISCELLANEOUS

Bacteriology of Ice

DESTRUCTION of bacteria in ice is most effective in the temperature range from 23 to 28 deg. F. Destruction is less both above and below that range, and extreme cold exerts a preservative effect on viruses and bacteria. When natural ice, at 23 to 32 deg. F., is held for several months, the nonsporing bacteria are greatly reduced in numbers.

Supercooled water may exist when drops of water are quickly chilled at 10 deg. F., and this may be the condition when molds and bacteria are found to grow on quickly chilled meat at 10 to 17 deg. F.

Germicidal ices, particularly those containing benzoates or 0.05 to 0.1 percent of sodium nitrite, show promise for icing certain food products, such as fish fillets.

Digest from "Bacteriology of Ice," by L. B. Jensen, *Food Research*, vol. 8, 265–71, July-August, 1943.

Questions and Answers

Packaged Molasses

Hawaii—"Will you please send me full information about the packaged molasses which was announced in the July issue of FOOD INDUSTRIES?"

There is very little more information available about this product than was given in the item mentioned.

Dr. Lyman Chalkley, of the Engineering Division, Office of Economic Warfare, whose interest in the subject resulted in this development, states that there is nothing particularly novel or difficult about the project. The molasses is simply evaporated down until the concentrate can be put warm into a special type of moisture-resisting paper bag or other container. Open-pan evaporation of the molasses will serve as well as any. The new packaging material is a multiwall bag with a moisture-resistant adhesive such as tar or asphalt.

It is our understanding that no real commercialization of the process has taken place, as yet, but that there are no restrictions on further use of the process by anyone who may be interested. Any patents obtained by Dr. Chalkley would be assigned to the government for general use.

Salad Dressing

Illinois—"We will appreciate your help in securing information on an emulsion-type French dressing with gum tragacanth as emulsifying agent."

A true French dressing is composed of salad oil and vinegar or lemon juice, in the proportions of about 2 to 1, with small amounts of salt, sugar and paprika. Powdered apple pectin has been used in this type of dressing, up to about 0.2 percent.

More highly stabilized dressings may consist of oil and an aqueous acid solution in about equal volumes. The commercially used formulas for this type were developed by the companies manufacturing them and are the property of those companies. We do not have exact data as to the stabilizers used.

From the latest information available it seems that pectin is a more suitable stabilizer for this purpose than gum tragacanth. Both the type of oil and the acidity influence the action of the stabilizers. Lotzkar and Maclay, in *Industrial and Engineering Chemistry* for December, 1943, report that for olive oil there is little difference between pectin and tragacanth as emulsifying agent, both being more effective at the lower pH values, while pectin is slightly

better than tragacanth for cottonseed oil. In general, the tragacanth-stabilized emulsions are reported to be coarse and viscous, and the pectin emulsions fine and viscous. The viscosity decreases with increasing acidity.

Egg Dehydration

New Jersey—"In dehydrating, what is the average weight per dozen of the raw eggs, and of the dry material produced? Also, is more than one stage used in spray drying today?"

The average weight of a dozen shell eggs is, in general, around 20 oz. Shell eggs vary considerably in size, and this is only an average figure. After the shells are removed, the average weight of the egg material, white and yolk together, is somewhere around 15 or 16 oz., again depending on the size of the original eggs.

After dehydration to the standard of 3.5 percent remaining moisture, these eggs should weigh 5½ oz.

Answering the second question, in the ordinary spray drying process there is only one stage, although there is a tendency in some directions to build two-stage spray dryers. Drying can be done satisfactorily in one stage when the drying equipment is provided with a good separator and the unfinished material is returned to the dryer in cases where there is underdrying in the first operation.

An article in the December, 1941, issue of FOOD INDUSTRIES, page 50, contained a good discussion of the spray drying of eggs.

Technical Consultants

Ohio—"We are interested in securing the names and addresses of laboratories or technical specialists who are prepared to make tests on foods, drugs and cosmetics as to the nutritional value of foods, as to the toxic value of foods, as to the properties of foods, drugs and cosmetics and the toxic properties of drugs and cosmetics."

It is unlikely that any one laboratory or group of consultants will be in a position to undertake investigations in all of these various fields. The Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y., acts as a clearing house for information on the scope and interests of laboratories and individuals available for consultation, including specialists in the fields mentioned. This is a nonprofit organization, and will furnish lists of consultants free. In addressing an inquiry to them, it is well to suggest as definitely as possible the scope of the work to be undertaken.

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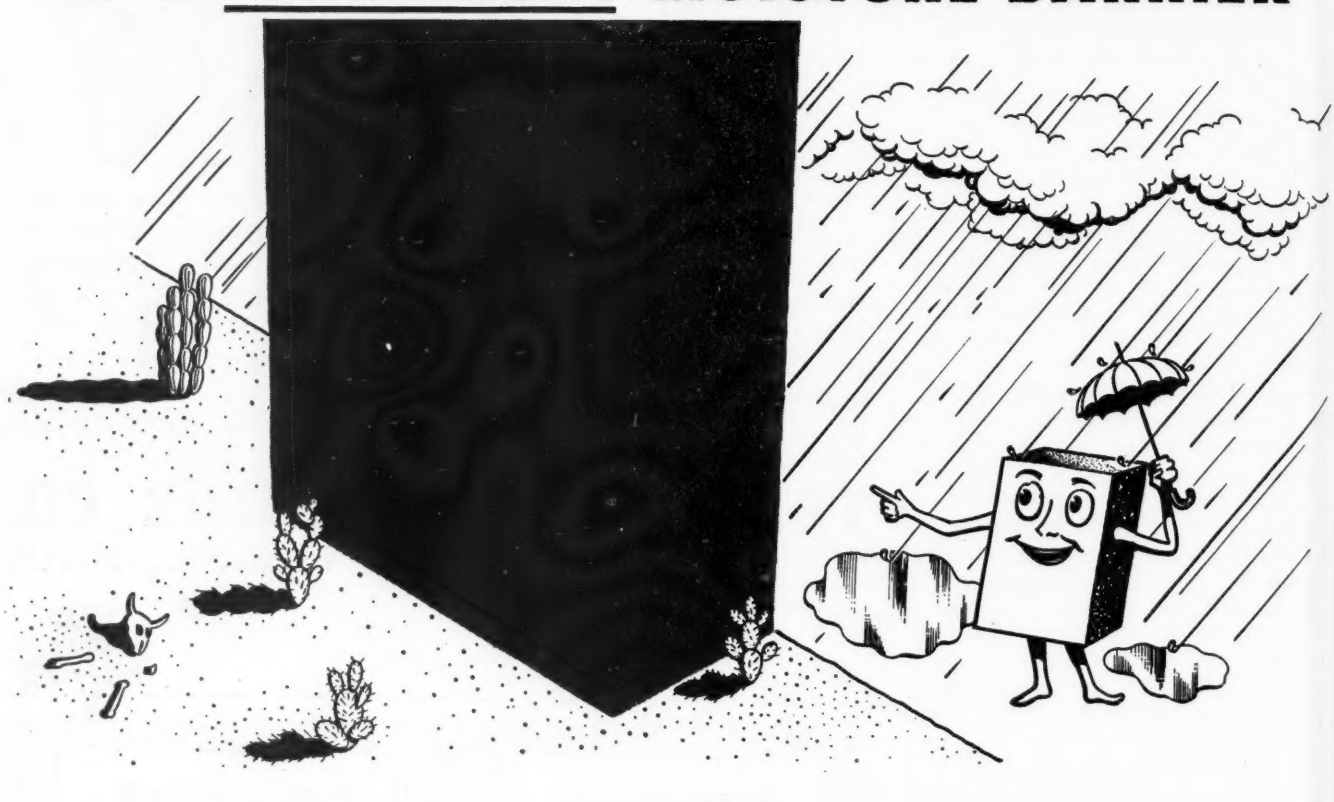

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Letters to the Editor

When Processed Food Is Not Processed Food

To the Editor
of Food Industries:

Your criticism in the October issue of FOOD INDUSTRIES of our use of the term "processed foods" to describe items rationed under Ration Order 13 is interesting. We are taking advantage of your fair offer to give us space for comment.

In setting up a rationing regulation, it was of greatest importance, in describing the products affected, to use a term which would be descriptive and understandable to the many consumers who know nothing of trade terminology. At the same time, it was necessary and desirable to use a term acceptable to the trade.

The term "processed foods" was selected, after discussions with members of the industry and the trade, as the best shorthand name available to represent the many canned, bottled and frozen fruits and vegetables and the dried fruits and fruit spreads to be rationed.

There would have been less difficulty in finding a suitable descriptive term if it had been planned to ration *all* foods produced through the use of processing equipment and procedures. Then there could have been no objection to an all-inclusive term. But even though short supplies of many of these foods called for rationing, it was not necessary, as you can readily understand, to ration all foods produced by processing equipment.

In this situation, it was not possible to hit upon a term which would be exactly descriptive of the products to be rationed, and of those only. Nevertheless, for purposes of simplifying the regulations, some phrase had to be found which would immediately suggest to consumers and the trade the types of foods affected. Everyone agreed that the term "processed foods," though not perfect, was easily the best one to be had.

We realized that the term, as used by the industry, unavoidably included some items which were not to be rationed; these items were therefore expressly excluded from our definition of "processed foods" by the simple expedient of declaring them not to be "processed foods" within the meaning of this definition. Those familiar with the complex technology of the food producing industry knew that the term, as narrowed, was not completely accurate. However, they understood, and accepted the manner in which it was used, since they recognized that no simple name would have met their standards. For those who, because of their purchases, must distinguish between rationed and unrationed commodities, those items which are rationed appear clearly and simply in the point-value table posted in all retail stores.

In the light of these considerations, we do not feel that a member of the industry or of the trade can regard this use of "processed foods" as technologically false or misleading. Furthermore, it does not establish a "dangerous precedent," as you claim, since our use of the term has meaning only in relation to rationing.

We appreciate your interest in these problems and are grateful for the opportunity to explain the reasons for our action.—W. F. STRAUB, *Director, Food Rationing Division, Office of Price Administration, Washington, D. C.*

EDITOR'S NOTE: *Editorial comment on this letter will be found on page* 81.

What Dehydrators of Carrots Should Do

(*Continued from page* 75)

or match when most of the air is displaced. This corresponds to removal of about one cubic foot of air. The lid is then sealed in place by a double seamer.

In one plant, Anabolic Foods Co., Glendale, Calif., 12 filled cans are placed in a vacuum chamber, evacuated to high vacuum, and the vacuum is then released with CO_2 gas. The atmosphere in the can should contain less than 2 percent of oxygen.

Two cans are packed in a wooden case or heavy fiberboard case. The cases are heavily strapped.

Sulphuring and Sulphiting

As previously stated, dried carrots soon acquire a stale, hay-like odor and flavor when stored in air. Even in CO_2 their flavor deteriorates fairly rapidly at temperatures of 80 to 100 deg. F.

In England, Canada and Australia, cabbage and potatoes to be dried for Army use must be dipped in dilute sulphite solution before drying. As yet, this treatment is not required for carrots. About a year ago, Mackinney, Friar, Balog and Jackins, under the writer's direction, blanched carrots in steam and then sulphured them in dilute SO_2 fumes for a short time. They then dehydrated them. After 6-months' storage at 95 deg. F. in air these still were of normal color, flavor and odor and retained most of their carotene. The blanched, unsulphured carrots had lost much of their carotene, were in fact nearly white in color, and had become inedible because of a very strong, stale, hay-like odor and flavor.

Others treated more recently by dipping in 0.25 percent potassium bisulphite (meta bisulphite) before drying also retained their color, odor and flavor much better than the untreated.

The writer is fully convinced that the bisulphite dip should be used, not only for potatoes and cabbage, but also for carrots. Then the use of tin containers and CO_2 gas could be dispensed with and the Army supplied with a superior product.

Specifications and Testing

The Army specifications require a negative peroxidase test, made by adding water, dilute benzidine and dilute hydrogen peroxide to a sample in a test tube, and the same reagents to a sample boiled 10 minutes to serve as a blank. No indicator color should develop in 15 minutes in either sample.

The product must contain not more than 5 percent of moisture, determined by drying in a vacuum oven by standard procedure, nor more than 2 percent of defective pieces. The carrots must be of normal color, flavor and odor.

For details, apply to the nearest office of the Food Distribution Administration, Dehydrated Foods Section, or to the Washington office of the Administration.

Food Distribution Costs

(*Continued from page* 60)

up a carload or truckload lays the basis for the country assembler, packer and merchant shipper who assembles and ships either for a fee or commission or as an independent merchant. Upon arrival at destination the shipment is received by a terminal market operator who either unloads and sells the shipment, usually to wholesalers or to retailers, or sells it intact to a wholesaler or other purchaser who breaks it up and sells it in smaller lots. Trade interests are many and at the terminal the course of distribution may fan out into numerous channels, including smaller wholesalers, chain stores, retailers, hucksters, hotels, restaurants and institutions. The perishable nature of many farm products necessitates their rapid movement through these channels of distribution.

In 1937, the Federal Trade Commission traced the movement of some

20,000 separate carload shipments of apples, table and juice grapes, grapefruit, oranges, peaches, cabbage, lettuce, onions, potatoes and tomatoes from producing regions throughout the country to eleven large terminal markets distributed territorially from Dallas, Tex., to Minneapolis, Minn., and eastward to the Atlantic seaboard. Data compiled for each shipment covered the growers' proceeds, packing and shipping merchants' margins, transportation charges, terminal market receivers' and wholesalers' margins, wholesale selling price and, in the case of chain store purchases only, retail prices charged.

A summary of these data shows that, on the average, distribution charges, including packing and loading, transportation and wholesale margins, absorbed about 57.4 percent for sales through chains and approximately 51.8 percent for sales through independents of the wholesale selling price for the samples of fruits covered; namely, apples, grapes (juice and table), grapefruit, oranges and peaches. For the sample of vegetables including cabbage, lettuce, onions, potatoes and tomatoes, the proportions were approximately 51.8 for chains and 61.4 for independents. For fresh fruits, the grower received a slightly higher return per dollar of sales at wholesale price on shipments sold to independent stores, but sales of vegetables to chain stores yielded net proceeds that were about 10 cents greater per dollar of wholesale selling price than sales to independent retailers. The data for fruits and vegetables are summarized in Fig. 1, covering shipments totaling $21,644,177 based on the wholesale selling price in eight terminal markets.

Transportation charges are a factor which varies with the method of transportation used, the distance transported, and the degree of competition between rail, water and other methods of transportation. For fresh fruits and vegetables, the distances may vary from a few miles to 3,000 miles or more, and the method of transportation may be by rail, water or truck. For the farm products covered by the survey, transportation represented approximately 29.3 percent for the fruits sold through chains, 31.9 percent for independents, of the wholesale selling price in the terminal markets sampled. For vegetables the transportation cost was about 31.6 percent for chains and 36.1 percent for independents.

Packing, loading and storage absorbed about 21.9 percent for chains and 18.2 percent for independents for the fruits of each wholesale dollar received, and for vegetables about 14.3 percent for chains and 18.0 percent for independents.

Packing expense is incurred at the point of origin. Loading charges may occur both at point of origin and as a part of terminal handling charges. Storage may occur either at the point of origin or at the terminal market. It may be either incidental to preventing deterioration while commodities are actually in process of distribution or it may be incurred, especially at points of origin, in order to spread the marketing of seasonal products, such as apples or potatoes, over long periods of time in order to obtain the best possible average price for the distributor. Much country storage is provided by merchant shippers who buy fruits and vegetables in season and assume the merchandising risk, or who store products for the account of growers. In the latter case, the storage plants normally operate on a fee or space rental basis.

These heavy charges, together with the margins of wholesale handlers—who took, on the average, about 6.2 cents for sales to chains and 5.1 cents for sales to independent retailers out of each wholesale dollar for fresh fruits, and nearly 5.9 cents for sales to chains and nearly 7.3 cents for sales to independents for vegetables—are all covered in the terminal market price.

The result is that the net proceeds to the grower, on the average, amounted to about 42.6 percent of the wholesale price at terminal markets for sales to chains and 44.8 percent of sales to independents for fruits, and for vegetables about 48.2 percent for chains and approximately 38.5 percent for independents.

Beyond the wholesale price at terminal markets, the retailer adds his gross merchandising profit, and the grower proceeds computed on the basis of retail prices to consumers represent for most fresh fruits and vegetables a comparatively small part of the retail sales dollar.

Figure 2 shows the proceeds to the grower, the packing and loading charges, transportation charges, wholesale distributors' margins and retail margins, in cents of the consumer's dollar, for certain fresh fruits and vegetables sold through chain stores.

In general, items which were transported relatively short distances and on which the chains added retail margins of less than 30 cents per dollar of sales yielded the largest proceeds per consumer dollar to growers.

Since freight charges are fixed, the principal effort of producers to increase their proceeds must be directed toward seeking the most direct and economical methods and channels of distribution. Eastern Shore potato growers, through the efforts of their cooperative, were able to sell both chain stores and independent retailers at about the same cost per barrel of potatoes sold, and to obtain distinctly larger proportions of the selling price of their products than producers of other commodities. Similar cooperative effort among growers of other products might result in the elimination of unnecessary middle-men and the absorption of their profits for the benefit of members of efficiently conducted cooperatives. The attainment of such economies by cooperatives, however, has been distinctly handicapped in the past by terminal market rules which restrict marketing operations to local associations of terminal operators, membership in which is closed to producer cooperatives. Growth of large chain store purchasing organizations and of cooperative purchasing organizations of independent retailers at the other end of the distribution chain would seem to offer opportunity for further dealing directly between producer-cooperatives and large cooperative or other purchasing organizations of retailers, provided their mutual efforts to deal directly are not unduly hindered by local market rules and regulations.

Section II of this summary will be published in "Food Industries" for February, 1944. It will cover transportation costs and the conclusions reached in the inquiry.—THE EDITORS.

Carotene from Sweet Potatoes

(*Continued from page 78*)

sweet potatoes and their trimmings or culls as a carbohydrate source for fermentation. Likewise, the residue left after extraction of carotene with organic solvents should still be valuable for root-starch production or for fermentation. Much of the carotene, along with some other organic matter, remained in the mother liquors after the crystalline carotene had been removed. These mother liquors would probably have some value as high-carotene concentrates for addition to animal feeds. The applicability from an economic standpoint of any one of the three methods probably depends upon how the method of carotene removal fits in with other processes applied to the sweet potato.

Summary

1. Carotene was extracted from fresh sweet potato pulp with acetone and precipitated from the extract in a crude but crystalline condition by addition of water. One recrystallization gave a product of 90 percent purity in a yield of about 39 percent of that present in the sweet potato.

2. A fraction containing two to four times as much carotene per kilogram as the original sweet potatoes was obtained by suspending the finely ground sweet potato material in 0.1 percent aqueous solution of Duponol C, a dispersing agent, centrifuging to remove the starch and fiber, and precipitating the washings with sulfuric acid. Crystalline carotene was isolated from the precipitated material.

3. Extraction of dried sweet potato material with petroleum ether, adsorption of the carotene on activated alumina, elution with methyl alcohol in petroleum ether, and crystallization by evaporation gave a product of 76 percent purity in a yield of 27 percent of that present in the dried material or 3 percent of that present in the original sweet potatoes. The serious loss which occurred during drying in this procedure may be reduced to some extent by drying under milder conditions.

4. In agreement with Matlack,[4] the carotene isolated from sweet potatoes was found to be the beta isomer.

Acknowledgment

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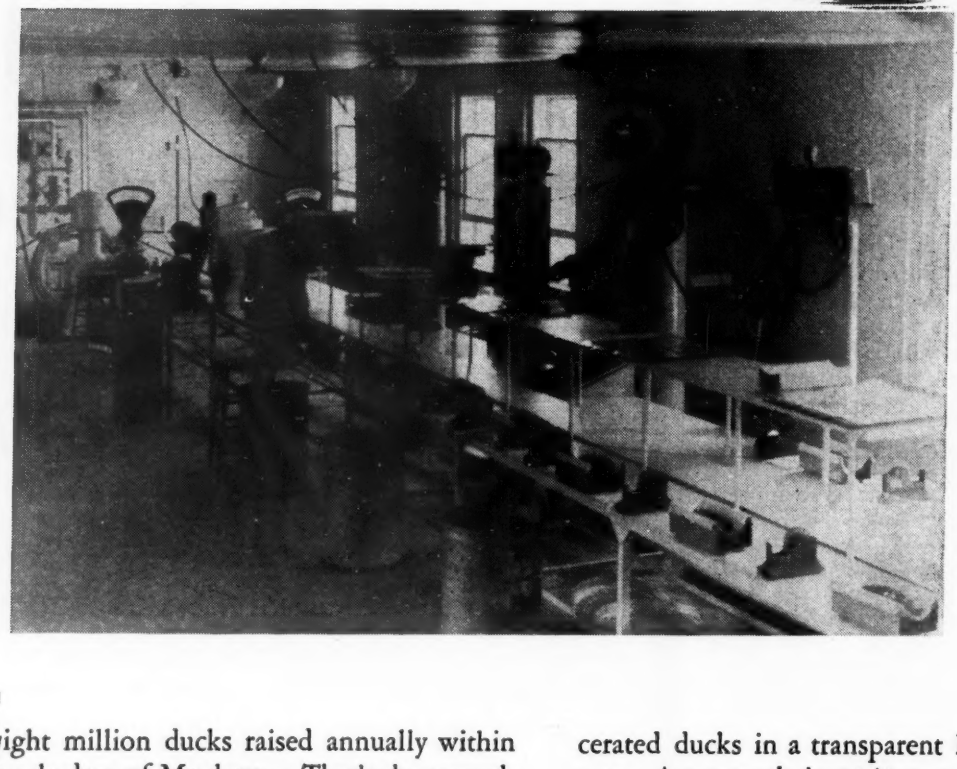

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FORMULA NO. 442

Plantation Cookies

Peanut butter	5 lb.
Molasses, good flavor	10 lb.
Sugar	2 lb.
Shortening	2 lb.
Milk, solids basis	¼ lb.
Salt	4¾ oz.
Water	5 lb.
Standardized invert sugar	½ lb.
Flavoring	as desired
Bread flour	2 lb.
High-sugar-carrying flour	8 lb.
Soda	¼ lb.
Baking powder	1½ oz.
Cinnamon	1¼ oz.

Directions

Mix the peanut butter and molasses together until smooth. Add the shortening, sugar, milk, and salt, creaming until smooth. Dissolve the standardized invert sugar and flavor in the water, and add to the mixture, together with the remaining dry ingredients which have been sifted together. Mix until smooth.

Bake at about 360 deg. F.

These cookies have a wide spread, a large volume and a round top. They can be deposited by hand or machine, or wire cut.

Formula from The Nulomoline Co.

FORMULA NO. 443

Frozen Fruit Puree

Berry puree, unsugared	639 lb.
Sugar (sucrose)	267 lb.
Gelatine, 275 bloom	5 lb. 13 oz.
Water	52 lb. 6 oz.

This will make 100 gal. of mix. With high-conversion corn sirup less fruit is necessary:

Berry puree, unsugared	610 lb.
Sugar (sucrose)	169 lb.
High-conversion corn sirup	127 lb.
Gelatine in water	58 lb. 3 oz.

With unsugared apricot, pear, prune, apple or other high-sugar fruits, the amount of fruit can be increased:

Puree, unsugared	680 lb.
Sugar (sucrose)	226 lb.
Gelatine	5 lb. 13 oz.
Water	52 lb. 6 oz.
Citric acid	1 lb. 14 oz.

Blends of half berry and half apple or pear are made in these proportions, but the citric acid can be omitted.

Directions

The mix can be prepared from fresh puree and then stored in the frozen state or the fruit puree can be stored in the frozen state and then used later in preparing the mix. To defrost the puree, or to defrost the mix for processing in an ice cream freezer, place in a cool room or set the container in cold water.

Disperse the gelatine in the water to make a 10 percent solution, sterilize at 170 to 180 deg. F., and mix into the cool puree while it is being agitated. No aging is necessary. Place the cooled mix in an ice cream freezer and handle the same way as ice cream. The overrun should be between 90 and 110 percent. The drawing temperature will usually be between 18 and 25 deg. F. Package and harden under the same conditions as ice cream.

Formula from Western Regional Research Laboratory, Albany, Calif.

FORMULA NO. 444

Honey Cookies (Basic Dough)

Brown sugar	6 lb.
Shortening	3 lb.
Honey	3 qt.
Molasses	1 qt.
Water	½ gal.
Salt	½ oz.
Cinnamon	2 oz.
Allspice	¼ oz.
Cloves	¼ oz.
Cardamom	¼ oz.
Soda	6 oz.
Cake flour	20 to 22 lb.

Directions

Cream the sugar, shortening, spices and soda. Next add the honey and molasses, which must be of high quality. Then add the water and finally the flour.

These cookies can be cut into shapes appropriate for Christmas, such as animals, stars, hearts, and so forth. Decorate the tops with colored sugar or a simple icing.

Formula from General Mills.

FORMULA NO. 445

Stock Sponge Cake

Granulated sugar	5 lb.
Egg yolks	14 oz.
Whole eggs	1 lb. 12 oz.
Salt	1 oz.
Milk stock	6 lb.
Vanilla flavor	1 oz.
Cake flour	5 lb. 8 oz.
Baking powder	2½ oz.
Soda	¼ oz.

Directions

Beat the sugar, egg yolks, whole eggs and salt until firm, approximately 5 minutes on third speed. Have the stock at 190 deg. F. Add this and the vanilla gradually to the sugar-egg mixture. Continue to beat on third speed while adding the stock and for one minute after all of the stock is added.

Sift the cake flour with the baking powder and soda, three times. Fold into the prepared mixture by hand. Do not overmix.

Bake at approximately 380 to 400 deg. F.

This is suitable for layers, cups, jelly rolls or loaf cakes.

Milk Stock

Water	6 lb. 4 oz.
Sugar or sirup	1 lb.
Milk powder	12 oz.
Cornstarch	4½ oz.

Bring the sugar or sirup and 5 lb. of water to a boil. Whip together the milk powder and cornstarch with the remaining water and add to the first mixture. Bring back to a boil but do not allow to cook.

Formula from Pillsbury Flour Mills Co.

FORMULA NO. 446

Pimento Loaf

Cured pork or sheep tongues	15 lb.
Cured pork snouts	10 lb.
Cured pork ears	5 lb.
Regular fresh pork trimmings	30 lb.
Fresh veal trimmings	40 lb.
Dry milk solids*	8 lb.
Shaved ice	35 lb.
Salt	2 lb. 4 oz.
Nitrite of soda	½ oz.
Dextrose	4 oz.
White pepper	7 oz.
Pimentos, No. 3 cans	2

*Not over 1½ percent fat

Directions

Chop veal and pork in silent cutter. While chopping add salt, nitrite, dextrose, ice, dry milk solids and pepper. When chopped fine, add pimentos and chop just long enough to cut pimentos so they show plainly.

Cut tongue, snouts and ears by hand or in head cheese cutter. Put all in mixer and mix until the cut pieces are evenly distributed.

Put mixture in molds and cook at 160 deg. F. for 3 to 4 hours, depending upon size of mold used. Chill and remove from molds. Stuff in cellulose casing or wrap in Pliofilm wrappers.

Formula from American Dry Milk Institute, Inc.

Correction

In Formula 433, for a stabilized, homogenized butter spread, published in November, the quantity of butter color should have read "150 ml. (milliliters)," in the formula using all cream. —The Editors.

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